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UNITED STATES
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GEOPHYSICAL ABSTRACTS 124

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V. L. SKITSKY

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UNITED STATES DEPARTMENT OF THE INTERIOR - BUREAU OF MINES

GEOPHYSICAL ABSTRACTS 124

January-March 1946[1]

Compiled by V. L. Skitsky[2]

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1. GRAVITATIONAL METHODS

8327. Apsen, Boris. The Eötvös Torsion Balance. Its Theory and Application in Higher Geodesy (in Croatian). Hrvatska Državna Izmjera, Zagreb, No. 4, 1942; pp. 48-56.

The initial instalment of this book gives the first two chapters. These deal with the history of investigations on the shape of the earth (as reveale particularly by gravimetric methods), with the components of gravity, and with anomalies and their causes. - Hoffmann (Zagreb), Ztrbl. Geophys., Meteorol. & Geodas., vol. 10, No. 3, 1942, p. 113.

8328. Barnitzke, J. E. Bestimmung der Bodendichte durch Gravimetermessungen (Determination of Ground Density by Gravimetric Measurements). Beitr. angw. Geophys., Leipzig, vol. 10, 1942, pp. 85-95.

Gravity measurements were made along a profile in hilly country to determine the density of rocks in their natural setting. Conclusions as to probable actual density are reached by applying the Bouguer correction based on differences in densities. - V. S.

Original from THE OHIO STATE UNIVERSITY

8329. Coster, H. P. The Gravity Field of the Western and Central Mediterranean. Bij J. B. Wolter, Groningen, Batavia, 1945, 57 pp., maps.

The gravity data of the western and central Mediterranean are presented and discussed. They include the observations of the expeditions of Vening-Meinesz made during 1923-36 on the ships "Vettor Pisani", "Fresnel", and "Espoir", as well as the free-air and isostatic anomalies, and the reductions of stations at Trapani and Cagliari. Seismic and geological evidence is also considered. It is found that the general distribution of positive and negative anomalies follows the pattern of the Netherlands East Indies. Positive anomalies predominate; they are not eliminated by isostatic reductions and must be explained by the existence of abnormal masses, as in the Indies. In his interpretation, the author attributes these anomalies only in part to connection currents. Other processes also must have played a role in the sinking of the Mediterranean deep-sea basins during the Neogene and Quarternary. These would explain the compensation of the basins found to take place at a depth of some 30 km. - V. S.

8330. De Lury, J. S. Outline of a Hypothesis to Explain Crustal Movements. Trans. Roy. Soc. Canada, Ottawa, 3d ser., vol. 39, 1945, pp. 1-11; List and Minutes 1945, p. 149.

The main ideas contained in a number of the writer's papers on crustal problems are correlated to provide an outline of a fairly complete hypothesis of earth movements. The concept of a thick crust as opposed to the shallow, weak shell assumed in isostatic theory leads to the views that crustal failure is a very protracted process and that magmas are not inherited but are generated by frictional heat in comparatively shallow levels within the crust. Thermal contraction is used to supply the forces for the mechanism of failure, but the classic theory of the manner of failure is abandoned. - Author's abs.

8331. Field, R. M. F. A. Vening Meinesz - A Geodesist's Contribution to Geoscience. Nat. Res. Council, Trans. Am. Geophys. Union, Washington, D. C., vol. 26, No. 2, 1945, pp. 183-189.

The geophysical surveys of the ocean bottom made by F. A. Vening-Meinesz during 1923-34 and his research and theoretical work are outlined and discussed in the light of isostasy. Particular attention is devoted to the exploration of the linear belt of negative gravity anomalies in the East Indian Archipelago, which is produced by a deficiency of density expressed in the islands and oceanward throughs of that region. The view is taken that Meinesz's hypothesis of the tectogene may be eventually modified or replaced, but that his discovery of the anomaly belt will remain the greatest advance in the application of gravitational physics to geology since the detection of the deflection of the vertical. Basic references are given on the gravimetric phases of marine geophysics and structural geology. - V. S.

8332. Hasselmann, K. F. A Technique for Making Torsion-Balance Surveys in Inundated Areas. Bull. Univ. Missouri Sch. Min. Met., Rolla, Mo., Tech. Ser., vol. 16, No. 2, 1945, 31 pp.

Field operations in regions where shallow-water areas existed demonstrated a need for a method of exploring these and similar areas. After considerable experimental work, a tripod and float were designed and constructed that made torsion-balance surveys of these areas possible. Extensive torsion-balance surveys of Galveston Bay in Texas and Barataria Bay in Louisiana led to the discovery of several oil fields. The method makes possible gravity exploration of inundated areas throughout the world. - Author's abs.

8333. Hubbert, M. K. Some Physical Considerations Bearing upon the Theory of Isostasy. (abs.) Geophysics, Menasha, Wis., vol. 10, No. 3, 1945, p. 455.

Although the theory of isostasy, as a generality, has by now gained virtually universal acceptance among the students of the earth, there is as yet no comparable agreement as to the significance of isostasy in various geological processes and of what phenomena may or may not be ascribed to isostasy as a cause.

The purpose of this paper is to review some of the physical aspects of the isostasy problems and to deduce criteria for distinguishing between those phenomena that are manifestations of isostasy and others that are not. These criteria will be in part mechanical and in part thermodynamical. By this means, it will be shown that diastrophism (including volcanism) and erosion are the truly fundamental dynamical processes of the earth, in comparison with which isostasy is but a minor and secondary adjustment phenomenon.

8334. Miller, A. H. Gravimetric Surveys of 1943 in New Brunswick (abs.). Trans. Roy. Soc. Canada, Ottawa, 3d ser., vol. 38, 1944, List and Minutes, p. 159.

Several exploratory traverses with a torsion balance by the Dominion Observatory in collaboration with the Geological Survey of Canada and the Department of Lands and Mines of New Brunswick tend to confirm the previously presumed existence of a buried anticlinal structure between Portage Vale and Coverdale, a distance of some thirty miles. Large negative anomalies of gravity between Portage Vale and Sussex may be due to the possible occurrence of salt, gypsum, or bituminous shales. A magnetic "high" was traced between Indian Mountain and Shediac Bay but no definite indication of an easterly extension of the Calhoun magnetic anomaly was observed at rather widely spaced stations on two traverses running south from Barachois and Cape Bald.

8335. Tanni, L. On the Isostatic Structure of the Earth's Crust in the Carpathian Countries and the Related Phenomena. Ann. Acad. Sci., Fennicae, Helsingfors, A 3, vol. 4, 1942, pp. 1-100.

A study has been made of isostasy in Carpathian countries on the basis of Polish, Hungarian, Austrian, Rumanian, Balkan, Black Sea, Eastern Alps, and North Italian gravity data. The anomalies were computed according to the international formula for gravity. Reductions were made by the free-air, Bouguer, and Airy-Heiskanen methods. The results are tabulated, and the isostatic anomalies are shown on three maps.

The maps reveal several regularities: (1) One narrow strip of low-gravity values borders the western Carpathian mountains, continuing apparently along the middle and eastern Carpathians. Another such strip borders the Russian plateau and joins the first strip south of Lwow. The junction is marked by an especially low gravity-minimum. (2) The Hungarian plain does not have as uniformly positive values, as the old measurements seemed to indicate. The new gravity distribution generally agrees with the conception of isostatic equilibrium. Other features of the maps are described. The conclusion is reached, that the chief reason of isostatic anomalies lies in a different thickness of the upper layers of the earth's crust. The study contains an appendix on the isostatic anomalies in entire Europe. - V. S.

8336. Vening-Meinesz, F. A. Gravity over the Hawaiian Archipelago and over the Madeira Area; Conclusions about the Earth's Crust. Proc. Ned. Akad. Wet., Amsterdam, vol. 44, No. 1, 1941.

The author points out that both the Hawaiian Archipelago and the Madeira area of volcanic origin are situated in deep-sea regions. He assumes that each group of islands has an average density of 10 to 15 percent greater than the surrounding rock, extending from the level surface of the surrounding deep-sea ocean-bottom to the surface of the islands. These heavy island masses are assumed to be regionally compensated; depth of compensation, 30 km.

The author finds that for a depth of compensation of 30 km. the average anomaly is a minimum for 3.07 density of island masses when the radius of the region of compensation is 174.3 km., or for 2.937 density when radius is 232.4 km. The average anomalies, without regard to sign, for the five areas considered are 15 and 11 milligals, respectively, whereas for local compensation and 30 km. depth of compensation the respective average anomalies are 88 and 81. - J. A. Duerksen.

8337. Woollard, G. P. Gravity Observations in the Maritime Provinces. Nat. Res. Council, Trans. Am. Geophys. Union, Washington, D. C., vol. 26, No. 2, 1945, pp. 191-196.

A gravity survey was carried out during 1944 in the Maritime Provinces of Canada. Observations made with an X-type gravimeter at 521 stations and corrected for the effects of latitude, elevation, and mass above sea level furnished the Bouguer values of anomalies for constructing isoanomaly contour maps. The results reveal a complex gravity field, particularly in central and northern New Brunswick, the Gaspe Peninsula, and southern Nova Scotia. Zones of marked positive anomalies stretch along the St. Lawrence River parallel to the Bay of Fundy and alternate with isolated areas of negative anomalies in other sections. They appear to reflect both deep-seated and near-surface lithologic variations typical of the Blue Ridge-Huston

Valley low, observed to extend from Virginia into northern New England. These and other geological correlations are discussed, with illustration by gravity-anomaly maps and sections. Further surveys are proposed. - V. S

2. MAGNETIC METHODS

8338. Barta, G. The Temperature Correction for the La Cour Magnetic Balance (in Hungarian). Idöjárás, Budapest, vol. 45, 1941, pp. 197-201, 227-228.

In the La Cour magnetic balance a variation of temperature produces a change of magnetic moment. The author formerly discussed the theoretical possibility of a correction by optical devices. In the present paper he describes such an arrangement. The influence of temperature upon the instrument is nullified by means of a bi-metal thermometer which responds to change by a curving of the bi-metal. The curvature modifies the path of light rays projected on a prism and effects a compensation of measurements for the temperature. Two diagrams demonstrate that the mechanical design fully satisfies theoretical requirements. - V. S.

8339. Cattala, L., and Rothé, J. P. Prospection magnétique sur le mineral de fer de la mine de Puymorens (Magnetic Prospecting of the Iron Deposit at the Puymorens Mine). Ann. Inst. Phys. Globe 1938, Monde, France, n. ser., vol. 3, pt. 3, 1941, pp. 120-126.

A magnetic survey has been made at the Puymorens iron mines situated in the eastern Pyrenees near the border of Andorre. Local geology and topography are described. The vertical component of the geomagnetic field was measured by means of a Schmidt's balance over a relatively small number of stations owing to limited time. The results showed two zones of major positive anomalies. The larger one, situated at an altitude of more than 2,150 meters, extended beyond the limits of the known deposit and ranged from 1,000 to 2,000 gammas. The smaller zone to the southwest ranged between 1,500 and 2,000 gammas. To the north and northwest of the positive anomalies, a zone of negative anomalies was detected that exceeded 1,500 gammas. More detailed exploration, including measurements of the horizontal component and declination, is recommended. - V. S.

8340. Deel, S. A. Alaska Magnetic Tables and Magnetic Charts for 1940. U. S. Coast and Geod. Surv., Washington, D. C., MD-8, 1944, 42 pp.

The present publication contains all available results of observations on declination, dip, and horizontal intensity made in Alaska and adjacent regions from 1870 up to and including 1941, with corresponding values for January 1, 1940, except that in case more recent observations were made at any station, the earlier observations have been omitted. As before, charts for declination, depth, horizontal intensity, and vertical intensity are included. - Author's abs., abridged by V. S.

8341. Evrard, P., and Koenigsfeld, L. Levé geomagnétique du Salmien superieur manganésifère de la vallée de la Lienne (Magnetic Survey of Manganese-Bearing Superior Salmien in the Valley of the Lienee). Ann. Soc. Géol. Belgique, Liége, vol. 67, No. 2, 1944, pp. 473-494.

A magnetic survey was made of a manganese deposit in the valley of the Lienne. The deposit lies imbedded in the superior Salmien, upper Cambrian layer, which has very weak magnetic susceptibility. The survey, begun with a Schmidt balance uncompensated for temperature variations, had to be resumed with a compensated La Cour balance which also responded to external temperature because of faulty construction but could be adjusted. Thermal corrections are discussed mathematically.

The magnetic measurements were found to vary within a small range and to be inconclusive as to the deposit. The largest anomaly, near Bierleux, reached a negative maximum of only 160 gammas; its theoretical equation indicated variation between negative and positive values. However, some indications were gained on geological configuration. The laboratory tests of local rocks, accompanying the measurements, gave very low coefficients of induced magnetic emanation. It is concluded that when metal deposits are embedded in rocks of very weak magnetic susceptibility, the magnetic method may be useful only for geological reconnaissance. The report contains critical appraisals by Dehalu, de Magnée, and Fourmarier. - V. S.

8342. Fleming, J. A. Summary of the Year's Work, to June 30, 1945, Department of Terrestrial Magnetism, Carnegie Institution of Washington. Terr. Magn. Atm. Elect., vol. 50, No. 4, 1945, pp. 279-286.

The war has rendered impossible the normal program of the Department because no expeditions could be sent to foreign lands or on the oceans to gather secular variation and other data. Moreover, the personnel engaged almost entirely in war work. Still, some important previous research was brought to conclusion. The activities reported for the year July 1, 1944, to June 30, 1945, are reviewed under the following headings: (1) Geomagnetic investigations, (2) terrestrial electricity, (3) ionosphere, (4) nuclear physics, (5) observatory and field work, and (6) publications. - V. S.

8343. Gelfand, I. S. Direct and Inverse Problem of the Magnetic Potential for a Spherical Segment (in Russian). Bull. Acad. Sci. U.R.S.S. (Izvestiia), Moscow, Sér. Géogr. Géophys., vol. 8, No. 5, 1944, pp. 292-294.

This paper gives formulas for the magnetic potential and the components of the magnetic force in the subsurface strata. These formulas have the form of a spherical segment in the case of uniform and direct magnetization. A method based upon the solution of the direct problem is suggested for the determination of the stratum of the spherical segment. It makes use of the observed values of horizontal and vertical components of the magnetic force at a known intensity of magnetization of rocks. - English summary by author.

8344. Ising, G. On the Magnetic Properties of Varved Clay. Ark. Mat. Astr. Fys., Stockholm, 29A, 1, No. 5, 1943, 37 pp.

It is suggested that varves containing ferromagnetic minerals should show anisotropic susceptibility acquired during sedimentation in the earth's magnetic field and thereafter unaffected by aging. This anisotropy should thus be a better record of the secular variation of the earth's field than the remanent moments, which may alter with time.

A series of varves from southern Sweden is examined, and such anisotrop is found, the minimum of susceptibility being in the vertical direction. Determination of the maximum susceptibility, however, is beyond present instrumental equipment. The direction of the remanent moment is nearly the same as that of the present field. The magnetic properties of the clay vary with distance of sedimentation from the ice border, and an annual period is found in the content of magnetic matter, the parts deposited in spring being several times more magnetic than those settling out in winter. The instruments used are described: they include an electromagnetic induction balance, a series of torsional magnetometers, a magnetic bridge, and a pendulum magnetometer. - A. Hu., Phys. Abstr., vol. 48, No. 568, 1945.

8345. Johnston, H. F. American Magnetic Character-Figure, C_A, Three-Hour-Range Indices, K, and Mean K-Indices, K_A, for April to June and July to September, 1945. Ter. Magn. Atm. Electr., Baltimore, Md., vol. 50, 1945, No. 3, pp. 237-240; No. 4, pp. 315-318.

Tables are given with explanatory text. - V. S.

8346. Kelly, S. F. Warning Re Geophysics. Nor. Min., Toronto, vol. 31, No. 27, 1945, p. 26.

The author cautions against arousing undeserved public mistrust through incompetent use of magnetic prospecting methods. There have been instances of this recently when prospecting was made for nonregistering minerals under unsuitable conditions and on overextended grids. Certain established facts about what can and cannot be done must be used for guidance. Iron ores can be detected successfully. Rock formations possessing different magnetic permeabilities offer adequate conditions for tracing contacts, shears, faults, folds, intrusions, etc., when close grids are used; subsurface mapping often leaves no other alternative. On the other hand, the pyrrhotitic sulfides require that magnetic surveys be checked electrically. Nonpyrrhotitic sulfides can not be detected at all and necessitate electrical methods. - V. S.

8347. Knapp, D. G., and Howe, H. H. Magnetic Observatory Results at Tucson, Ariz., for 1935-36. U. S. Coast and Geodetic Survey, Washington, D. C., MO 20, 1944, 122 pp.

Original from THE OHIO STATE UNIVERSITY

This publication contains extensive tables of observatory results, reproductions of magnetograms showing the more important magentic storms, and an explanatory text. The tabulated results include hourly mean values of the magnetic elements D, H, and Z, summaries of their monthly and annual means, collected mean diurnal variations for each month, season, and year, lists of principal magnetic disturbances, amounts of noncyclic change, observed and adopted base-line values of the D, H, and Z variometers with their abrupt changes, etc. The text includes a description of instruments, discussions of their coefficients and behavior and of the procedures used, and explanations of the various tables. - Authors' abs.

8348. Meyer, O. Einige Tabellen über die erdmagnetischen Registrierungen im Observatorium Wingst im Jahre 1940 (A Few Tables of Terrestrial Magnetism Records at Wingst Observatory in the Year 1940). Ann. Hydrogr., Berlin, vol. 70, 1942, pp. 260-263.

A brief account is given of the activities of the magnetic observatory at Wingst, Germany, during 1940. Information on the instruments employed includes the scale values and temperature coefficients of variometers. The data on D, H, Z, and I are tabulated as selected averages for different periods of time and different conditions of weather. Certain normal values, secular variations, and character figures are presented. - V. S.

8349. Mining Journal, Phoenix, Ariz. Magnetometer Proved to be Valuable in Oregon Tests. Vol. 29, No. 10, 1945, p. 45.

A summary is given of the report of E. L. Stephenson on a survey carried out in 1942 on the black sands of the Oregon southwestern coast. It was made by the U. S. Bureau of Mines in conjunction with the Oregon Department of Geology and Mining Industries to test the efficiency of magnetic methods (see Geoph. Abs. 123, No. 8219). - V. S.

8350. Molin, Kurt. A General Earth Magnetic Investigation of Sweden Carried Out During the Period 1928-1934 by the Geological Survey of Sweden, parts 3-4, Horizontal Intensity, Vertical Intensity, and Horizontal Disturbing Force. Sveriges Geol. Undersökning, Stockholm, ser. Ca, No. 33, 1941, 105 pp.; No. 34, 1942, 104 pp.

The series of reports on the general geomagnetic investigation of Sweden during 1928-34 is continued. Issues 3 and 4 deal with horizontal intensity, vertical intensity, and the horizontal disturbing force. Table and maps are given with explanatory text. Their scope and presentation follow closely those adopted in issues 1 and 2 on declination and inclination (see Geophys. Abs. 89, No. 3685, and 99, No. 5183). - V. S.

8351. Richards, M. E. Magnetic Surveying in Progress in Missouri Iron Ore Areas. Skillings Mining Review, Duluth, Minn., vol. 34, No. 38, 1946, pp. 1, 11.

Original from THE OHIO STATE UNIVERSITY

Several magnetic surveys were made recently in the region of Iron Mountain and Pilot Knob, southeastern Missouri. (1) In a locality near Bourbon, a magnetic anomaly registered 4,000 to 6,000 gammas over an area of 1 square mile. Three holes were drilled through approximately 1,500 feet of sedimentary rock, limestone, sandstone, and porphyry until the latter showed iron ore. (2) In another locality, between Pilot Knob, Iron Mountain, and Bourbon High, a magnetic anomaly averaged about 10,000 gammas. It stretched along a general strike in line with these mining towns and suggested, by its position, the existence of an iron belt in this region. Porphyry outcrops are found here on three hills, and the local geology resembles that of the Iron Springs mining district in Utah. No drillings have been made. - V. S.

8352. Scott, W. E. Mean K-Indices from Thirty Magnetic Observatories and Preliminary International Character-Figures for 1944. Terr. Magn. & Atmos. Elect., Baltimore, Md., vol. 51, No. 1, 1946, pp. 67-73.

Tables are given with explanatory text. The year 1944 was comparatively quiet; there were moderate magnetic storms on April 2 and December 16-17 and disturbances in February, March, August, and October. No perfectly calm 3-hour interval occurred. - V. S.

8353. Terada, K. Electromagnetic Induction Within the Earth's Crust of Variable Conductivity. Jour. Meteorol. Soc. Japan, Tokyo, vol. 17, 1939, pp. 17-18, 191-198.

The magnetic potential in the earth composed of many concentric spherical shells of different electric and magnetic properties is mathematically calculated when the earth is sounded by a nonconducting atmosphere. The formulae are simplified in some special cases. From the results of calculation, it is found that the vertical magnetic force does not change appreciably by a rapid periodic change of the magnetic field, and that a sufficiently thick spherical shell can almost prevent the penetration of periodic magnetic induction. When the change is aperiodic, no conclusive results are obtained. - Y. Kodaira, Ztrbl. Geophys. Meteorol. Geodäs., vol. 5, 1940, pp. 19-20.

8354. Umbgrove, J. H. F. Recent Theories on Polar Displacement. Amer. Jour. Sci., New Haven, Conn., vol. 244, No. 2, 1946, pp. 105-113.

New theoretical considerations on large polar displacements were published by a few Dutch authors during the past war years. A synopsis, in English, of the principal points of these new hypotheses is desirable, because two papers are in the Dutch language and one, moreover, is a thesis. In his discussion of the subject, the present author gives his motives as to why he thinks the new theories on large polar displacement, as well as their predecessors, are unsatisfactory and should be abandoned. - Author's abs.

8355. Walton, M. S., Jr., and Kennedy, G. C. Magnetic Exploration of the Nickel-Copper Deposits of Bohemia Basin, South-Eastern Alaska. Econ. Geol., Lancaster, Pa., vol. 40, No. 7, 1945, pp. 496-502.

The Bohemia Basin nickel-copper deposits are segregations of pentlandite, pyrrhotite, and chalcopyrite in the lower portions of a norite mass, the bottom of which is basin-shaped. Eight traverses were made with an Askania vertical intensity magnetometer across the projected position of the deposit beneath a covered area. Magnetic anomalies were observed at the inferred position of the deposit along six of the traverses and indicate that the body is continuous beneath most of the covered area.

Magnetic profiles are consistent with the hypothesis, proven at two places by outcrops and drill holes, that the deposit dips inward. The profiles and outcrops indicate that the deposit averages about 80 feet in thickness. The profiles also suggest that the deposit, under the covered area, extends down the dip for a distance greater than its thickness, and that the muskeg cover is not deep. These inferences are consistent with available drill data. The inferred quantity of sulfide-bearing material in the deposits was increased from 5,000,000 tons to 8,500,000 tons by the results of magnetometer exploration. The magnetic data will facilitate planning of any future development of the deposits and would have been useful in the more effective placing of some of the holes already drilled. - Authors' abs.

8356. Wenner, Frank. Gauss's Method of Measuring the Horizontal Component of the Earth's Magnetic Field. Trans. Am. Geophys. Union, Washington, D. C., vol. 27, No. 2, 1946, pp. 164-167.

This paper makes use of a discussion of Gauss' method of measuring the horizontal component of the earth's magnetic field as a means for presenting those ideas concerning the nature of magnetic quantities which have been promulgated by the International Electrotechnical Commission. Reference is also made to the actions taken or initiated by that commission relative to the fundamentals of measurements of mechanic, electric, and magnetic quantities. - Author's abs.

8357. Wulf, O. R. On the Relation Between Geomagnetism and the Circulatory Motions of the Air in the Atmosphere. Ter. Magn. Atm. Electr., Baltimore, Md., vol. 50, No. 3, 1945, pp. 185-197.

Variations of the geomagnetic field are discussed in relation to the circulatory motions of the air in the atmosphere. It is pointed out that large-scale circulation in the altitudes of the diurnal wind system of the dynamic theory must contain both zonal and meridional components and is subject to similar variations as the air flow in the lower atmosphere. The prevalence of a strong upper circulation could explain a considerable portion of the behavior of the geomagnetic elements from hour to hour, day to day, and month to month. It could also have an important bearing on the origin of the earth's field and its secular variation. Possibly, magnetic disturbances may be traceable in part to the fluctuations occurring in this upper circulation. - V. S.

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8358. Wulf, O. R. A Preliminary Study of the Relation Between Geomagnetism and the Circulatory Motions of the Air in the Atmosphere. Terres. Magnet. Atmos. Elec., Baltimore, Md., vol. 50, No. 4, 1945, pp. 259-278.

Comparison is made of different forms of the daily traces of the geomagnetic elements with large-scale atmospheric pressure patterns near the base of the stratosphere over an area in which the magnetic observatory lies, in a preliminary study along lines suggested by the considerations in an earlier article. Illustrations are given of a few daily examples, but the comparison is made by obtaining the averages of the magnetic elements and of certain characterizing features of the pressure patterns for two groups of days equal in number for all of the days of each of 14 months. Comparison is also made of the daily values of magnetic disturbance (K-sums) with a measure of the change of pressure pattern over the day for the days of the same interval. It is concluded that the data, at least as presented in this preliminary study, do not afford reliable indication of a relation between geomagnetism and the circulatory motions of the air in the atmosphere. - Author's abs.

3. SEISMIC METHODS

8359. Adler, J. L. Notes on Formulation of Seismic Velocity. (Abs.) Geophysics, Menasha, Wis., vol. 10, No. 3, 1945, p. 457.

A method is presented for determining, from reversed refraction profiles, the best-fitting value of the factor K where $V = V_0 + KZ$. Charts are included which reduce to a few minutes the time required for the computation. Velocities determined by well shooting support the following conclusions:

Use of this formula in lieu of actual interval velocities to simplify both refraction and reflection computing generally introduces little error within the vertical limits of the data to which the factor K has been fitted. Extrapolation of the velocity curve may result in gross inaccuracy, and a logarithmic type of curve fitted to available well shooting or T-Δ T data affords a better basis for extrapolation. After such extrapolation, an over-all best-fitting value for K can be determined that will produce less error than the value of K determined strictly in the region of observed data.

8360. Barthelmes, A. J. Application of Continuous Profiling for Refraction Shooting. Geophysics, Menasha, Wis., vol. 11, No. 1, 1946, pp. 24-42.

A method of refraction shooting is developed for the purpose of investigating subsurface structures by utilizing the principle of continuous profiling now generally in use for detailed and more accurate reflection surveys.

The basic assumptions and the general theory, which will allow individual depth determinations for all geophone locations, are discussed. The practical application is illustrated with sample records and cross sections.

Original from THE OHIO STATE UNIVERSITY

Several field techniques, as well as efficiency with regard to accuracy, production, and cost, are discussed and analyzed. - Author's abs.

8361. Born, W. T. The Attenuation Constant of Earth Materials, II. (Abs.) Geophysics, Menasha, Wis., vol. 10, No. 3, 1945, p. 450.

The internal friction in a number of rod specimens of consolidated rocks was measured by a dynamic method previously described. The losses in water-free specimens were found to be substantially independent of frequency, whereas rocks containing moisture showed, in addition, losses increasing with frequency. The logarithmic decrement of dry rocks ranged from 0.005 for a specimen of Italian marble to approximately 0.05 for sandstone specimens. (For pt. I, see Geophys. Abs. 106, No. 6154. - V. S.)

8362. Cagniard, L. Quelques résultats d'une étude théorique de la réflexion et de la réfraction des ondes séismiques progressives (Some Results of a Theoretical Study of the Reflection and Refraction of Progressive Seismic Waves). Ann. Inst. Phys. Globe, 1938, Mende, France, n. ser. vol. 3, pt. 3, 1941, pp. 106-116.

In 1904, Lamb showed that theoretical seismology should investigate propagation of a signal, rather than propagation of harmonic conditions. Proceeding on simplified assumptions, he studied the surface propagation of waves generated by a surface-point source. The author generalizes Lamb's results by applying them to two elastic media and a point source situated at depth. A solution is sought for propagation in both media and in the intervening plane surface that would account for factors of transmission, alternatives in the relation between wave velocities, superficial pseudo-waves, and spherical pseudo-waves of distortion. Fourier's integrals are avoided with a view to attaining perfect mathematical rigour. The discussion is illustrated by diagrams of reflection and refraction in different phases of propagation. - V. S.

8363. Canadian Mining and Metallurgical Bulletin. Petroleum and Natural Gas. Montreal, No. 401, 1945, pp. 499-500.

According to a recent report of the Alberta Petroleum Association, 15 seismograph parties are now working in Alberta, representing 11 companies, which to date is the largest number active there at one time. Although, in the past, seismograph surveys have not proved particularly successful on the plains of Alberta owing to the variable thickness of glacial drift, some success is indicated by the results obtained in the Jumping Pound area in the Foothills belt and also in the Princess area. The future may bring important discoveries of buried structures suitable for petroleum accumulation. During the summer of 1943, the Dominion Government completed a seismic survey in Wainwright area, and, as a result, three structures were indicated, the most promising of which appears to be the Vale Dome.

8364. Cody, M. C. Richmond Exploration Has Active Campaign Started in Venezuela. Oil & Gas Jour., Tulsa, Okla., vol. 44, No. 18, 1945, p. 77.

The Richmond Exploration Co., subsidiary of Standard Oil of California, has acquired concessions in Venezuela and started surveys which include seismic work. The holdings designed for exploration cover 1,152,000 hectares and are divided into the Zulia concessions and the Reco concessions. The Zulia group has in the field four scouting parties, two seismograph parties, and one geological party. - V. S.

8365, Cowles, L. G. The Narrow-Band Resistance-Coupled Amplifier. Geophysics, Menasha, Wis., vol. 10, No. 3, 1945, pp. 394-405.

A method for the design of the amplifier coupling circuit is presented in a form permitting the selection of circuit constants directly from a specified band width, peak frequency, and peak-frequency coupling loss. The design procedure is illustrated by several practical examples; the limitations of the narrow-band amplifier are discussed. - Author's abs.

8366. Dix. C. H. The Interpretation of Well Shot Data: Simplest Cases of Lateral Velocity Variation. (Abs.) Geophysics, Menasha, Wis., vol. 10, No. 3, 1945, p. 456.

The case of the linear velocity-depth relation $V = V_d + az$ is generalized to include bx, giving the lateral variation. By a rotation of coordinates through an angle $\Theta = \tan^{-1} (b/a)$, $V = V_d + az + bx$ becomes $V = V_d + (a/\cos \Theta)z$. If one well is shot from several shot points in line, the horizontal distance from the well to the place where the line of centers of ray circles intersects a shallow level datum is approximately $(1/2)(z^2/d)$, where d is distance from well to point on datum corresponding to minimum travel time from points on datum to well point at depth z. The approximate height of this line of centers at the well can be found so we can find the tilt of the datum. More general cases are discussed. (For the preceding paper, see Geophys. Abs. 122, No. 8089. - V. S.)

8367. Fillippone, W. R. Depth-Displacement Slide Rule. Geophysics, Menasha, Wis., vol. 11, No. 1, 1946, pp. 92-95.

A slide rule is described, based upon formulae for circular arc ray paths, to compute depth and displacement of seismic reflectors when time of reflection, angle of dip and velocity-depth distribution are known. The rule may be used to compute horizontal and vertical displacement for reflectors on point-plotted sections if dips do not exceed 5 degrees. An alternative is a modification of a standard log-log trig slide-rule, which serves the same purpose. - Author's abs.

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8368. Fu, C. Y. Studies on Seismic Waves: I. Reflection and Refraction of Plane Waves. Geophysics, Menasha, Wis., vol. 11, No. 1, 1946, pp. 1-9.

By taking the apparent velocity along the boundary as the parameter instead of the angle of incidence, the equations for the different wave amplitudes may be put in more symmetrical forms. In this way, it is more convenient to discuss both the body waves and the Rayleigh waves at the same time. A defect of plotting the square root of the wave intensity against the angles is also discussed. When the reflection or refraction coefficient is not real, the meaning of the intensity, as obtained by squaring the absolute value of the latter quantity, needs clarification. - Author's abs.

8369. Fu, C. Y. Studies on Seismic Waves: II. On Rayleigh Waves in a Superficial Layer. Geophysics, Menasha, Wis., vol. 11, No. 1, 1946, pp. 10-23.

Lamb's method in the theory of the plate is extended to the case in which one of the surfaces is not free. The resulting determinantal relation is similar to that of Sezawa. It is then simplified, and special cases of the frequency-velocity relation are discussed. Even when the thickness of the layer is as small as a wave length, the interaction of the upper and lower boundaries of the layer is quite slight, and Rayleigh waves and Stoneley's waves may be discussed separately. A few points in connection with the application of this frequency relation to the ground-roll problem also are discussed. - Author's abs.

8370. Geyer, R. L. Combined Surface and Seismic Exploration Party. Bull. Am. Assoc. Petrol. Geol., Tulsa, Okla., vol. 29, No. 12, 1946, pp. 1781-1782.

In exploring petroliferous deposits, geological and seismic parties often work simultaneously but independently. This practice results in a duplication of surveying and a failure to correlate data. The author proposes a combined geological-seismic party under a single chief. The personnel of both units is put together and a junior geologist is added. The latter is to study outcrops, test shot-hole samples, and correlate these with seismic data. If a portable laboratory is provided, this work can be done in the field. The organization of such a party is illustrated by a diagram and its advantages are discussed. - V. S.

8371. Harris, Sidon, and Peabody, Gwendolyn - Refraction Exploration in West Texas. (Abs.) Geophysics, Menasha, Wis., vol. 10, No. 3, 1945, p. 454.

A brief historical summary of refraction shooting is given, with special emphasis on western Texas. A general discussion of more recent techniques is presented with a few simplified methods of computation as applied to the Edwards Plateau and other localized areas in western Texas. A brief description of field problems and techniques is given.

8372. Hoylman, H. W. Seismograph Evidence on the Depth of the Salt in Southeast Texas. (Abs.) Geophysics, Menasha, Wis., vol. 10, No. 3, 1945, p. 450.

Reflection seismograph records shot over the top of the shallow Moss Bluff Salt Dome, Chambers County, Texas, show bands of energy which can be reasonably identified as reflections from the base of the salt. Depth calculations place the bottom of the salt mass at approximately 16,000 feet. Later events on the records are either reflections from the basement complex or multiple reflections. Assuming they are from the basement, the depth is calculated as approximately 25,000 feet. Alternatively, the time relations can be fitted closely in terms of multiple reflections between the base of the salt and the interface at the contact of the cap rock with the overlying sediments where the velocity discontinuity is a maximum.

8373. Jones, W. M. The Use of Differences of Arrival-Times of P as an Aid to Epicentral Determinations in the South Pacific. N. Z. J. Sci. Tech., Wellington, vol. 26 B, 1944, pp. 146-154.

Curves have been drawn covering the more important seismic portions of the South Pacific, showing the differences in P-arrival times between Wellington and Brisbane and between Wellington and Suva, Seismological Observatories, for a normal and for a deep-focus earthquake, according to Jeffreys and Bullen's 1940 Tables. Other curves show the distances from these observatories to points over the same area. The plotting is on a Mercator projection. The use of such curves in determination of epicenters is briefly discussed. The effects of focal depth are illustrated by diagrams, which show the magnitude and direction of the displacement of epicenters when normal focus is assumed for a deep-focus earthquake, and two methods are indicated by which a good approximation to an epicenter can be found directly from the P-arrival times at four or more stations without making any assumption of focal depth. - C. J. G., Phys. Abstr., vol. 48, No. 572, 1945.

8374. Jones, W. M. Note on a Table of Distances from South Pacific Seismological Observatories. New Zealand Jour. Sci. Tech., Wellington, vol. 27, No. 2B, 1945, pp. 163-166.

A table has been compiled, mainly for seismological purposes, giving, in degrees and minutes, the "geographical" distances from five South Pacific observatories to points, at intervals of 1 degree in latitude and longitude, in the South Pacific region, from 0° to 35° south latitude and from 160° eas to 170° west longitude. A sample sheet only is printed here as basis for a brief discussion of the table. - Author's abs.

8375. Kendall, J. M. Airplane-Noise Interference with Seismic Prospecting. Geophysics, Menasha, Wis., vol. 11, No. 1, 1946, pp. 82-91.

The low-frequency sound produced by airplanes is briefly investigated, and its propagation through the atmosphere is considered. Data on a cargo-type airplane are presented. Rough calculations to determine the response of geophones to this sound field indicate that one airplane can blanket an area of several hundred square miles. Measures suggested for minimizing the interference are discussed. - Author's abs.

8376. Kugler, H. G., Mackenzie, S. C., Stainforth, R. M., Griffiths, J. C., and Brotherhood, G. R. Report on Exploration for Oil in British Guiana. Geol. Surv., Br. Guiana, Georgetown, Demerara, Bull. 20, 1942 (1944), 78 pp. Price, $1.00.

In 1939 a seismic survey was made in the Berbice basin of the coast of British Guiana. It aimed at determining the thickness of sediments and ascertaining whether any well-bedded sediments existed between the unconsolidated layer and the basement. The method consisted of reversed refraction profiles combined in suitable localities with reflection traverses.

The results revealed a structure at Rose Hale, and a test well was sunk in 1941. Boring reached the basement between 6,310 and 6,410 feet, whereas seismic velocities of 18,400 feet had placed it at 6,420 feet. Some encouragement was derived from the considerable thickness of the sediments and an intermediate velocity bed indicating a possible Cretacean formation of the type carrying oil in the Orinocco basin. However, the tests proved to be disappointing; the velocity bed was actually a conglomerate, and only heavy oil showed up at some 6,074 feet. Thereupon, exploration was discontinued.

Nevertheless, the authors do not discount the possibility of oil on the Guiana coast. In the light of theories on the existing oil traces, the chances seem greatest for the continental shelf off the northern shore. (Reviews of this paper appeared in Bull. Imp. Inst., London, vol. 43, No. 3, 1945, pp. 243-245, and Bull. Am. Assoc. Petrol. Geol., vol. 30, No. 1, 1946, pp. 120-121). - V. S.

8377. Leet, L. D. A Three-Component Portable Seismograph for the Measurement of Vibrations. Nat. Research Council, Trans. Am. Geophys. Union, Washington, D. C., vol. 26, pt. 1, 1945, pp. 33-36.

Described is a portable seismograph having a weight of 65 pounds and dimensions of 12 by 14 by 19.25 inches. It gives a record directly proportional to displacement for vibrations of a frequency of three cycles per second or more , and a magnification of 25 yielding a full registration from about 0.0005 to 0.035 inch.

The construction is a mechanical-optical system damped magnetically, with inertia elements suspended by flat springs. Its connection with the recorder is effected by means of a beam of light traveling to a condensing lens placed above three fixed mirrors. A concave mirror on the horizontal component receives from its fixed mirror a rectangular patch of converging light, with the long axis vertical, and returns an upright image to the face of the outer of two long plane mirrors. Therefrom the beam travels by 11 reflections to a cylindrical lens which brings it down to a point and transmits it on to the surface of the photographic paper for registration. For the vertical component, the path of the beam is slightly different. Operation of the instrument is described. - V. S.

8378. Lyons, P. L. The Low Velocity Layer in Seismic Exploration. Min. Mag., Denver, Colo., vol. 35, No. 10, 1945, pp. 546-548, 591.

The presence of a low-velocity layer (lvl) interferes with seismic records. Lvl can be defined as a variable surface layer of the land crust, within the elements of which the velocity of compressional waves is abruptly less than that of rocks below, usually less than 5,000 feet per second. As such, it should not be identified with the geological weathered, aerated surface, or definite unconsolidated layer. The layer's constituent elements and properties, the average lvl velocity (V_1) and the average refraction velocity (V_2) for the high-velocity beds below lvl, are discussed; the latter velocity is treated with reference to the homogeneity of underlying layers.

(1) The transmission characteristics of the lvl favor lower reflection frequencies and thus tend to turn the layer into a part of the seismograph's receiver. The ensuing interference is the cause of a high percentage of poor reflection records. Shear waves are transmitted well, but not compressional waves.

(2) Variations of the lvl are common in mature topography; corrections for them are discussed. A calculation of lvl depth offers difficulties, but the easy determination of the time delay simplifies computation of an approximate value. In seismic practice, a universal 2,500'/sec. velocity is usually adopted regardless of local conditions. - V. S.

8379. Matthews, T. H. An Elementary Proof that the Path of a Seismic Wave Will be Circular if the Velocity Increases Linearly with Depth (abs.). Trans. Roy. Soc. Canada, Ottawa, 3rd ser., vol. 39, 1945, List and Minutes, p. 148.

A proof by elementary methods is given that the quickest path between two points A and B on the surface is an arc of a circle when the velocity increases linearly with depth. Also that the wave-front of a disturbance starting at any point P is a sphere of a non-intersecting coaxial system. - Author's abs.

8380. Narvarte, P. E. On Well-Velocity Data and Their Application to Reflection Shooting. Geophysics, Menasha, Wis., vol. 11, No. 1, 1946, pp. 66-81.

Current methods of computing seismic reflection data employing the integration of the actual velocity-depth (or velocity-time) relation in the velocity column are confronted with difficulties and limitations because they neglect the stratigraphic effect upon the velocity distribution.

A method is proposed by which the measured incremental time-depth relation, Z/ T, to each of a number of stratigraphic markers may be combined into one generalized depth or time function satisfying well-velocity data from a number of wells. The proposed method employs the integration of this slope relation and is used in conjunction with regional correction contour maps. Because this relation results from the combined load and stratigraphic effects together with the geological behavior of the section, this method offers distinct advantages both in accuracy and applicability. Advantages and limitations in the application of this method are discussed. - Author's abs.

8381. Radio Craft. Earthquake Recorder. New York, vol. 16, No. 5, 1945, p. 287.

Describes the seismograph designed and operated by F. Keller of New Kensington, Penna. A horizontal pendulum is used for the pick-up. Light reflected from a mirror on the boom falls on a photocell. The electrical output of the cell is amplified sufficiently to operate a galvanometer capable of writing on smoked paper. - F. J. H., Bibl. Seismol., No. 17, 1945, p. 291. (See also Geophys. Abs. 121, No. 7975. - V. S.).

8382. Robertson, Florence. On Long-Period Seismographic Disturbances. Trans., Am. Geophys. Union, Washington, D. C., vol. 27, No. 1, 1946, pp. 11-13.

A series of experiments was carried out at Saint Louis using the Macelwane-Sprengnether horizontal component electromagnetic seismometers working in synchronism with type H-S, L and N galvanometers having a period of 20 seconds; both the seismometer and the galvanometer were critically damped. With this equipment, some more or less regular long-period disturbances were recorded. These disturbances were finally eliminated by operating the seismographs in a seismic vault in which both the temperature and the humidity were controlled. Although no physical explanation for this can be given at the present time, it appears worth while to point out that, these results are similar to those found by Milne in Tokyo, The United States Coast and Geodetic Survey in Honolulu, and by Shaw in England. - Author's abs.

8383. Rothé, J. P. Les séismes des Alpes Francaises en 1938 et la séismicité des Alpes Occidentales (The Seismic Activity of the French Alps in 1938 and the seismicity of the Western Alps). Ann. Inst. Phys. Globe 1938, Mendo, France, n. ser., vol. 3, pt. 3, 1941, pp. 1-105.

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The seismic activity of the High Alps (Hautes Alpes) during 1938-39 is described from a macroseismic and microseismic angle. The major shocks in other parts of the French Alps during 1938 are also related. Particular attention is devoted to the earthquake of July 18, 1938, discussed with respect to such problems as geological effects, structure of epicentral zone, calculation of epicenter, thickness of covering layer, and time of origin at the hypocenter, with a verification of Macelwane's table for distant stations. A background to this activity is provided by an historical account of seismicity in the entire western Alps before the 19th centur and during 1800-1940. Sketch maps, profiles, a chronological list, and a bibliography are included. - V. S.

8384. Sheffet, David. Geophysical Prospecting Equipment. Electronics, New York, vol. 18, No. 12, 1945, pp. 116-123.

Four million dollars are spent annually in the United States on electronic equipment for geophysical exploration. The greater part of this amount is used for seismic apparatus employing different types of electroni circuits that include variable sensitivity amplifiers for recording galvanometers, time control for recorders, and time registration for indicating the time and depth of shot. These are described in application to such phases of seismic field work as gain control, avc problems, electronic variable resistors, use of filters, phase distortion limitation, seismic recording practice, communication circuits, and complete recording units. Diagrams of circuits and samples of seismograms illustrate the text. - V.

8385. Shook, E. M., Olson, R. W., and Kerr, R. B. Combination of Amplitud and Frequency Modulation for Communication in Seismograph Exploration for Petroleum Reservoirs. Proc. Inst. Radio Eng., New York, vol. 32, No. 10, 1944, pp. 583-590.

The reflection-seismograph method of exploring and contouring various subsurface geological beds suitable for petroleum deposits is reviewed briefly. Instrumentation techniques are passed over briefly, with the exception of equipment as described, which is devised to transmit and recei by frequency modulation certain electrical impulses generated coincident with the detonation of the dynamite charge and with the arrival of the seismic impulse at the earth's surface immediately above the explosive charge. Amplitude modulation of voice signals was devised for transmission and reception over the same radio channel. The combination of the two schemes of modulation provided suitable voice reception without interfering with the frequency-modulation system to record the time break and uphole geophone electrical impulses free of static and accurate to 1/1000 of a second. The apparatus provides also for transmission of these impulses and voice signals by wire transmission with the same magnitude, clarity, and precision by means of simple switching arrangements. The 10-watt input amplitude-modulation-frequency-modulation transmitter devised is ample for the purpose up to 1 mile, which is sufficient for reflection seismograph exploration. - Authors' abs.

8386. Smith, Hampton. Review of Petroleum Exploration Sciences. Petrol. World, Los Angeles, Calif., Annual Review, 13th ed., 1945, pp. 91-95.

Exploration techniques were improved in a number of ways during 1945. Particular attention is deserved by a new seismic method for water-covered areas which has been used off the coast of the Los Angeles basin by the United Geophysical Co. The seismic detectors are suspended a few feet below the surface of the water from cables operated by barges. When the lines occupy their positions, the terminal detectors must be shot in by instruments situated on the shore. It is found that vibrations carry through the water as readily as through the earth, and records have equal utility.

In the Los Angeles survey, the area explored extended up to 3 miles off shore, at a depth of not more than 60 feet of water. Dynamite was detonated at various levels between the bottom and the surface of the water, with charges not in excess of 40 pounds. Under optimal conditions, the cost proved to be only slightly greater than that of land surveys. Some other innovations in exploration are described. - V. S.

8387. Valenzuela, J. I. Earthquake-Resisting Structures. Engineer, London, No. 178, 1945, pp. 64-67.

Reference is made to disastrous earthquakes in Chile, Japan, and San Francisco, and the consequent urge to improve the resistant qualities of buildings. Research on model and earthquake records has resulted in a new theory, which takes into account the earth oscillations and also the mass and elasticity of buildings, thereby enabling the forces acting on the various members of a structure to be calculated. Earth tremors are propagated by longitudinal waves radiated from the hypocenter, followed by slower transverse waves; these are followed by the principal waves from the epicenter. The irregular motion of the epicenter causes great danger to buildings. Earth tremors may have periods from a few hundredths of a second up to 10 seconds, but the most destructive waves have a period of 1 to 2 seconds. In relation to the foregoing, the natural periods of different structures are examined, and a description is given of an elasticity meter designed and constructed in the University of Chile. - G. E. A., Phys. Abstr., vol. 48, No. 574, 1945.

8388. Widess, M. B. Effect of Surface Topography on Seismic Mapping. Geophysics, Menasha, Wis., vol. 11, No. 3, 1946, pp. 362-372.

The presence of rough surface topography in a prospect frequently constitutes a source of error in seismic mapping and poses the question of what computational methods can be applied by which seismic maps might be freed of the effect of surface relief. Various aspects of the problem are described. The use of a plane datum horizon is generally adequate as a solution of the problem. The datum horizon may be modified to account for the overburden effect, the approximate magnitude of which is considered. Further modification may be required by lateral variations in subweathering velocity. Statistical analysis for determining the degree of conformity between surface topography and mapped structure at depth is a useful tool in the study. - Author's abs.

Uemura, Kimio. Contribution to the Results of Geophysical Prospecting Recently Made in Japan (abs.). Intern. Geol. Cong., 17th Sess. U. S. S. R., Abstracts of Papers, Moscow, 1937, p. 186 (see Abs. 8393 in this issue).

4. ELECTRICAL METHODS

8389. Evjen, H. M. The Principle of Variation in Path, with an Applicatio to Structural Mapping. (Abs.) Geophysics, Menasha, Wis., vol. 10, No. 3, 1945, p. 453.

A general functional analysis of the low-frequency electric exploration problem is presented. The theory is applied to some field data where a fair degree of subsurface control exists.

8390. Guelke, R. A Geophysical Prospecting Instrument Using Alternating Currents of Audio-Frequency. Jour. Sci. Instr., No. 22, 1945, pp. 141-145.

In Hedstrom's modification of the Sundberg method of geophysical measurements, difficulties are encountered in balancing an a.c. bridge employed for detection when a petrol-driven generator is used for supplying the current in the earth wire, owing to frequency variations caused by changes in the generator speed.

A tuning fork controlled oscillator is described in which frequency stability permits the use of a resonance bridge circuit very sensitive to phase and frequency variation. The tuned circuits in the two halves of the bridge also eliminate the effects of disturbing fields. Phase balance is achieved by simultaneous increase of one tuning condenser and decrease of the other, and an intensity balance can be completed by means of a simple potential divider. Full circuit details are given of the oscillator and bridge circuit, with the detector amplifier. - A. W., Phys. Abstr., sec. B, vol. 48, No. 573, 1945.

8391. Guyod, Hubert. Electric Log Interpretation, Parts 1-4. Oil Weekly, Houston, Tex., vol. 120, Nos. 1-4, 1945, pp. 33-42, 38-41, 33-40, 36-46

Part 1. The first step in the location of petroleum is the discovery of suitable reservoirs. At present, the potential graph of an electric log, notwithstanding its shortcomings, is probably the best tool available to the oil industry for locating porous media. The possibilities and limitations of the method are reviewed.

Part. 2. Frequently fractured or cavernous limes and dolomites cannot be picked from the potential graph of an electric log. These porous media are usually easier to distinguish from the denser zones by using a resistanc curve. How this is done is explained.

Part. 3. Part of the difficulties experienced in the interpretation of electric logs made in fairly resistant formations is due to the failure to use true resistance data instead of the noncorrected values given by the log. When and how the necessary correction should be made is explained.

Part 4. The importance of true resistivity data is further clarified by an explanation of their use in the estimation of petroleum saturation in sand-type reservoirs. - Author's abstracts.

8392. Ku, K. H., Wang, T. C., and Chang, H. C. An Investigation of the Chaotung Lignite Field by the Wenner's Resistivity Method of Electrical Prospecting. Contr. Econ. Geol., Kueiyang, China, No. 1, 1944, pp. 111-116.

An electrical survey has been made of the Chaotung lignite deposit of north-eastern Yunan. This formation is a flat layer stretching a few meters below the Chaotung basin. It varies in thickness from a few centimeters to more than 15 meters and is completely overlaid by gravels, sand, and clay mostly low in electrical resistivity. The view had been held that the deposit extends over an area of 200 square kilometers.

The survey was made by means of Wenner's resistivity method, with the use of an electrical "megger", over 100 widely scattered profiles. Lignite behaved in most parts as a high-resistivity material. The curves plotted for the profiles were compared with corresponding geological sections and the data of sample tests. The results indicated that the deposit is continuous only on the western and southern rims of the basin, has a width of 2 to 3 kilometers, and even there thins out locally. A recent geological survey had lead to similar conclusions. - V. S.

8393. Uemura, Kinio. Contribution to the Results of Geophysical Prospecting Recently Made in Japan (abs.). Intern. Geol. Cong., 17th sess. U. S. S. R., Abstracts of Papers, Moscow, 1937, p. 186.

In 1922 the Geological Survey of Japan began a series of studies and applications of geophysical prospecting. The author directed the work.

1. Electrical surveys were made by means of resistivity, potential, potential-drop-ratio, and induction methods. They explored metallic deposits of cupriferous pyrite in crystalline schists, various types of veins in rocks, contact metamorphic copper deposits, black ore deposits, bituminous coal seams, oil-bearing strata, faults, buried granite hills, and underground waters. In the Yabase oil field, Akita District, the resistivity method detected rich oil-bearing layers located at depths less than 150 meters. In the Joban coal field, the fault plane between granite and the Tertiary rocks was traced and the hade calculated from the data.

2. A seismic refraction survey was conducted at the Kashiwazaki oil field to determine the configuration of the oil-bearing Tertiary formation. Radio seismographs with six receivers constructed in Japan served for registration. The results conformed closely to the logging data of bore holes. (An English abstract is given in Japanese Journ. Geol. Geogr., Tokyo, vol. 19, Nos. 1-4, 1944, Abstracts, p. 33). - V. S.

8394. West, T. S. A Resistolog Survey of the Loma Alto-Seven Sisters Area of McMullen and Duval Counties, Texas (abs.). Geophysics, Menasha, Wis., vol. 10, No. 3, 1945, p. 453.

Additional field results with the Resistolog procedure are shown. This method of direct current resistivity prospecting was described in the Octobe 1944 issue of Geophysics (see Geophys. Abs. 119, No. 7712). Precise measurement of subsurface electrical properties is attained by eliminating from the data the influence of surface or near-surface variations in resistivity.

5. RADIOACTIVE METHODS

8395. Baranov, V. I., Kunasheva, K. G., and Tseitlin, S. G. The Use of Radiochemical Analysis for the Correlation of Geological Strata (in Russian). Bull. (Izvestiia) Acad. Sci. U.R.S.S., Moscow, Classe Sci. Chim., 1943, pp. 178-190.

The Ra and Th contents of the rocks in the Permian and Upper Carboniferous strata from Upper Uslon bore holes near Kazan are reported. The radioactivity decreases in the rocks in the order limestone, dolomite, anhydrite, gypsum. The average Ra content is 5.38×10^{-11} percent, equivalent to 1.61×10^{-4} percent U, and Th is 1.09×10^{-4} percent. The Th/U ratio of 0.68 is much lower than in most rocks. Only the carbonates of the Schwagerina horizon show a high Th content, and this fact may be useful in their identification. Bore hole H_2O from this region contains up to 5×10^{-11} percent Ra and 8×10^{-16} percent MsThI. The presence of Ca and especially of Ba in the H_2O favors the presence of Ra. The radioactive elements in the H_2O are probably dissolved from the minerals of the region. Chem. Abs., vol. 38, No. 7, 1944, p. 1452.

8396. Beers, R. F. Radiometric Determination of Potassium in Rocks and Soils. (Abs.) Geophysics, Menasha, Wis., vol. 10, No. 3, 1945, p. 455.

The radioactive isotope of potassium $19^{K^{40}}$ emits beta and gamma rays, which offer a convenient means of quantitatively determining the potassium content of rocks and soils. When the radiations from uranium and thorium minerals in the samples approach equality with the number from potassium, measurement of both beta and gamma rays are required for differentiation.

The paper describes a method of making both beta and gamma measurements with the same apparatus. Calibrations and corrections for absorption of radiation by the sample are given. The influence of potassium radiations on gamma-ray well logs is discussed.

8397. Bullard, E. C. Geological Time. Mem. Proc. Manchester Lit. Phil. Soc., Manchester, vol. 86, No. 4, 1943-45, pp. 55-82.

The methods for measuring geological age are discussed in the light of the recent advances by N. B. Keevil and A. O. Nier demonstrating the superiority of the lead time scale over the helium scale.

It is found that the methods based upon the known rates of radioactive disintegration of uranium and thorium have requirements difficult to satisfy in practice. 1. The quantities of uranium, thorium, and of their products, helium and lead, identified in a rock must be susceptible of precise measurement. 2. These quantities should change under the influence of radioactive decay alone and not of any other processes. 3. At the beginning, the rock should be free from radioactive elements, or else the lead or the helium produced by radioactive decay should be distinguishable from that present initially.

Investigations have shown that helium is likely to be free of radioactivity from the start. Lead, however, does not satisfy either one of the last two alternatives, and the lead method cannot be applied for measuring the age of igneous and sedimentary rocks. - V. S.

8398. Fearon, R. E. How the Properties of Nuclear Radiation Influence Radioactivity Logs. (Abs.) Geophysics, Menasha, Wis., vol. 10, No. 3, 1945, p. 452.

The effect of penetrating power of nuclear radiation, the amount of corpuscular energy, and the ability of various nuclear radiations to excite secondary processes is discussed with respect to gamma-ray well logging. The importance of the transformations to which neutrons are susceptible is discussed with respect to their influence on neutron logs. Experimental demonstrations of some of the common properties of nuclear rays were given.

8399. Jackson, W. J., and Campbell, J. L. P. Some Practical Aspects of Radioactivity Well Logging. Am. Inst. Min. Metal. Eng., New York, Tech. Pub. 1923, 1945, 27 pp.

Automatic recording of the radioactivity of the earth's formations provides a log of relative intensities that, if properly interpreted, can be applied to oil-field engineering. Production, engineering, and geological departments regard the radioactivity log as a step forward in obtaining more conclusive information for successful well completions. Explanations of the technique, together with some of the problems to which radioactivity logging have been applied, are presented in this paper. - Author's abs.

8400. Roggen, F., and Scherrer, P. Über einen Nachwirkungseffekt an Zählrohren bei Bestrahlung mit Röntgenstrahlen (Regarding an After-effet Produced in Counters by X-Ray Illumination). Helv. phys. Acta, Basel, vol. 15, 1942, pp. 497-500.

Radioactivity counters were subjected to illumination by X-rays of 160 to 180 kv. for about 20 minutes. A hightened zero effect was observed thereafter. Its decline with time could be plotted in two exponential curves for a duration of 7 and 18 minutes, respectively. In order to trace this effect to any particular part of the counter, each part of a dismantled counter was subjected separately to illumination. Then the counter was reassembled and tested. The results showed that the thermal effect is limited to the cathode and disappears when this is made of zinc or plated with gold. When aluminum is used, the decline follows the course computed by Tanaka for an ideal isolating layer. The same is true, to a lesser extent, of other materials. It is concluded that the observed phenomenon should be attributed to the action of a thin isolating layer. - V. S.

8401. Starik, I. E. Radiological Investigation of Mineral Waters in the Caucasus Region (in Russian). Bull. Acad. Sci. U.R.S.S. (Izvestia), Moscow, Sér. Chim. Sci., 1943, pp. 435-442.

A general discussion of the occurrence and origin of radioactive waters Few experimental observations are given. It is considered that the leachability of rock structures is an important factor, hitherto underestimated, in determining the radioactivity of waters in contact with them. - V. B., Brit. Abs., Sept. 1945, p. 254.

8402. Wickman, F. E. A Graph for the Calculation of the Age of Minerals According to the Lead Method. Årsbok Sveriges Geol. Undersok, Stockholm, vol. 37, No. 7, 1944, pp. 1-6.

For values of Pb/(U+Th) and U/(U+Th), separate graphs are given showing ages 10 to 100 and 100 to 3200 million years. - L. J. S., Mineral. Mag., London, vol. 27, No. 187, 1944, p. 69.

6. GEOTHERMAL METHODS

8403. Bullard, E. C. Thermal History of the Earth. Nature, London, vol. 156, 1945, p. 35.

The heat of the earth is discussed with regard to its variations and sources. (1) Geothermal gradients show regional and local variations. The regional variations depend in part upon the conductivity of rocks which characterizes heat flow. Unfortunately, conductivity is difficult to measure, has seldom been determined in thermal surveys, and remains little known. Studies made recently in Great Britain, South Africa, and Persia show that the product of the gradient by the conductivity is nearly constant The local variations of gradients are due partly to geological structure; for example, salt domes affect heat distribution because of their high conductivity. (2) The earth derives its heat largely from processes of radioactive decay. Investigations on the amount of radioactive elements

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in rocks indicate that granite is rich in them and may explain gravity anomalies. Since there is apparently no granite under ocean basins, the radioactive heat under these basins should be less than under continents, and corespondingly the density. The resulting density-differences could produce convection currents and variations in gravity that would cause anomalies. - V. S.

De Lury, J. S. Outline of a Hypothesis to Explain Crustal Movements. Trans. Roy. Soc. Canada, Ottawa, 3d ser., vol. 39, 1945, pp. 1-11 (See abs. 8330 in this issue).

8404. Heald, K. C. Introduction to the Summary of Research-Results Prior to 1932. Am. Petrol. Inst., New York, Annual Report of Progress - Fundamental Research on Occurrence and Recovery of Petroleum, 1943, (1944), pp. 173-178.

In outlining the research made by the American Petroleum Institute during 1926-31 on the occurrence and recovery of petroleum, the author reviews Project 25, Determination of Geothermal Gradients in Oil Fields on Anticlinal Structures. This investigation was undertaken to test observations that the temperature at a depth of a thousand or more feet on the crest of an anticlinal structure is higher than the temperature at the same depth on the flank of the structure. If this relationship were general, then comparisons between the average temperature for a region and the temperature in a wildcat well would indicate the well's position with respect to structure.

The evidence obtained showed that, although the indicated relationship was fairly common, it did not invariably occur. Moreover, the difficulties encountered in making thermal measurements in wildcats rendered prospecting impractical. It was also found that surface temperatures above oil accumulations were not higher than those in the surrounding territory. On the other hand, measurements made on salt domes were abnormally high; they could not compete, however, with other geophysical methods for detecting salt domes. (For contrary views, see publications of R. W. French, S. S. Kovner, M. C. Terry, J. H. Burney, and C. E. Van Orstrand). - V. S.

8405. Kovner, S. S., and Shneerson, B. L. Thermal Method of Prospecting Versus Gravitational and Electric Methods. Compt. rend. (Doklady) Acad. Sci. U.R.S.S., Moscow, vol. 47, No. 1, 1945, pp. 28-30.

The Termen-Elga region, U.S.S.R., is known to contain an Artinskian limestone dome. Such a structure usually holds rock salt on one limb and anhydrites on the other. The dome had not been detected by the gravitational and electric methods applied, for reasons indicated. The authors then made a survey by means of the geothermal method to test its serviceability in prospecting for minerals. The work was carried out in the light of previous data on the thermal conditions of rocks (Geophys. Abs. 114, No. 7066; 115, No. 7188; 123, No. 8259). These rendered it possible to plot the thermal fields of two explored cross sections, one through the dome and another outside of it; calculations were made by a special time-saving method

(Geophys. Abs. 115, No. 7189). The thermal curves obtained revealed an anomaly over the Artinskian dome which attained 0.63° C. at a depth of 100 meters and 1.28° C. at 200 meters. The conclusion is reached that thermal measurements can detect the existence and indicate the position of an Artinskian dome. - V. S.

8406. Mining Journal, London. Temperatures in Rand Mines. Vol. 224, No. 5721, 1945, p. 229.

Flugge-de Smith and Oscar Weiss presented papers on thermal measurements in Rand Mines at a recent meeting of the Chemical, Metallurgical, and Mining Society of South Africa at Johannesburg. 1. Oscar Weiss employed electrical resistance thermometers. About 250 readings were made in 17 specially drilled underground holes, and inordinate types of anomalies were encountered. In his account, the speaker stressed the need of much caution in comparisons of different mines: (a) Differences may exist in actual temperatures or in temperature gradients; (b) the dip of local beds and the time used for cooling the works before measurements should be considered; and (c) Ventersdorp lava and a Karroo cover increase temperatures appreciably. 2. Flugge-de Smith used clinical maximum thermometers. Numerous difficulties were encountered. The temperature at the depth of 9,900 feet was predicted to be around 115.5° F. - V. S.

7. GEOCHEMICAL METHODS

8407. De Ment, Jack. Fluorochemistry. Chemical Publishing Co., Inc., Brooklyn, N. Y., 1945, 752 pp. Price, $14.50.

This book embraces the theory and various applications of fluorescence, luminescence, and other radiation. The work of numerous investigators is outlined in its bearings on the basic concepts of fluorochemistry, homogeneous and heterogeneous luminescent systems, ultraluminescence, and infraluminescence. The properties of luminescent substances are tabulated; one table lists 2,836 fluorescent organic compounds, with notations about the excitation conditions, nature of the luminescence produced, solvent, and literature. The text is supplied with a nomenclature and bibliography. (Reviews appeared in Am. Jour. Sci., vol. 244, No. 7, 1946, pp. 531-532, and Mines Mag., vol. 35, No. 3, 1945, p. 133). - V. S.

8408. Horvitz, Leo. Recent Developments in Geochemical Prospecting for Petroleum. Geophysics, Menasha, Wis., vol. 10, No. 4, 1945, pp. 487-493.

A number of surveys completed during the past 2 years indicate that the geochemical prospecting technique can be applied successfully only when an area is explored that is sufficiently large to enable ready distinction of the anomaly from the background. The geochemical anomalies found by reconnaissance sampling have been proved to be associated with structure by reflection seismograph. These confirmations indicate that the two methods can be used to supplement one another - one to detect the possible presence of a petroleum accumulation and the other to determine the probable depth of the accumulation.

The results of a reconnaissance geochemical survey over the Heidelberg area of Jasper County, Mississippi, are presented. - Author's abs.

8409. Mokhtiev, Sh. F. Petroleum Prospecting by Means of Gas Sampling (in Russian). Azerbaidzhanskoe Neftianoe Khoziaistvo, Baku, No. 1, 1941, pp. 15-17.

The author discusses the method of gas sampling proposed by Sokolov for petroleum prospecting. The chief disadvantage of the method is that the gas diffusing from the petroleum field does not rise in a strictly vertical direction. The presence of hydrocarbons in the soil atmosphere resulting from the decomposition of organic matter must also be considered in taking gas samples. Although gas sampling is a valuable method of petroleum prospecting, its practical application requires further studies. - Chem. Abs., vol. 38, No. 4, 1944, p. 853.

8410. Mining and Industrial Magazine of Southern Africa. Seeking Oil by Means of Bacteria. Johannesburg, vol. 33, No. 9, 1945, p. 577. Also: Rhodesian Mining Jour., Johannesburg, vol. 18, No. 225, 1946, p. 45.

The question whether there is oil in South Africa remains unsettled. Exploratory drilling in the low lands yielded no discoveries. To clarify uncertainty, the author recommends broad reconnaissance by means of the new bacterial method developed in the United States during the war. The underlying theory holds that petroleum is the product of the conversion of certain raw materials by bacteria in the earth removing nitrogen, phosphorus, and sulfur from organic matter and leaving only petroleum compounds. This process eventually forms oil accumulations, which begin to emanate gases escaping in minute quantities from any depth to the surface. The saturation of the soil is too small to be detected by any known chemical analysis. However, late research has revealed that desulfo-vibro bacteria are attracted by these emanations and congregate in the localities of high saturation. Accordingly, exploration can be guided by the density of the distribution of this variety of bacteria in the soil. Drilling tests based upon this principle have been successful. - V. S.

8411. Thyssen, Stephan, von. Allgemeines über Bodenuntersuchungen auf Kohlenwasserstoffe und Versuche in der Nahe eines norddeutschen Ölfeldes (General Considerations Concerning Explorations of the Ground for Hydro-carbons and Trials in the Vicinity of an Oilfield in Northern Germany). Öl und Kohle, Berlin, vol. 38, 1942, pp. 555-557.

The basic facts of geochemical prospecting are indicated and the field tests made in Germany reported. 1. Solid hydrocarbons are less suited for use in geochemical exploration than liquid and gaseous hydrocarbons; among the latter, the higher fractions are credited with greater diagnostic significance. The ground's specific absorption capacity probably is also a factor. Little is known as yet about the concentrations, migrations, and diffusions of hydrocarbons in the ground. Generally, the fundamental theoretical conceptions are still lacking. 2. A few trials of hydrocarbon prospecting for oil have been made in Mölme. They consisted in taking samples of ground along traverses traced over known salt domes and oil deposits. These samples were analyzed by the Geological Scientific Service in the United States. The results obtained are plotted and discussed. Other tests in the Mölme region were undertaken by the Seismos Co. - V. S.

8412. Tripp, R. M. Micro-Migration of Gaseous Hydrocarbons as Related to Geochemical Prospecting. Min. Mag., Denver, Colo., vol. 35, No. 10, 1945, pp. 513-515.

The physical and chemical properties of the strata which surround petroleum accumulations might have a diagnositc value in exploration. In order to clarify such a possibility, the author considers, in mathematical terms, the nature of porous media, mechanics of fluid movement, thermodynamics of the vertical migration of gases, and influences in the vadose zone. The conclusion is reached that the different analyses of soil hydrocarbons as to rate of efflux or amount adsorbed offer little promise in exploration because of the many indeterminable factors involved. Certain secondary influences in the investigated area may prove to be better guides in exploration. - V. S.

8. GENERAL AND UNCLASSIFIED GEOPHYSICAL SUBJECTS

8413. Blau, L. W. Geofísica, Geoquímica y el Practico de Petróleo (Geophysics, Geochemistry, and the Practical Man of Petroleum). Industria Min., Buenos Aires, vol. 5, No. 52, 1945, p. 31.

The province and principles of geophysics, geochemistry, and the related fields of physics, chemistry, geology, mining, petroleum engineerin electricity, etc., are discussed briefly with a view to dispelling the prejudices of "practical" oil men who mistrust the theoretical character of scientific reasoning. A few facts on the development of geophysics are given. - V. S.

8414. Boyd, L. H. Army Vehicles for Geophysical Crews. Min. Mag., Denver, Colo., vol. 35, No. 10, 1945, pp. 538, 590.

During 1945 many geophysical companies throughout the United States purchased Army vehicles discarded after the war. These cars have proved themselves to be particularly suited to rough country inaccessible to ordinary cars. They have been used by gravity crews in the Everglades of

Florida as plane-table or instrument carriers, some of the latter amphibious. The vehicles offered for sale can also be converted into reconnaissance cars, seismograph recording trucks, and to other purposes. - V. S.

8415. Fedynsky, V. V. Geophysical Prospecting for Oil in the U.S.S.R. at the Time of the Patriotic War, 1941-43 (in Russian). Bull., Acad. Sci., U.R.S.S. (Izvestiia), Moscow, Ser. Geogr. Geophys., vol. 8, No. 5, 1944, pp. 229-243.

In the U.S.S.R., geophysical exploration has been conducted by Government agencies. Before World War II the Commissariat of the oil industry established for such purpose a geophysical trust and the State oil industry had a central Office of Geophysical Prospecting, etc. The war augmented exploration one and one-half times during 1941-43. Various methods served in the work.

1. Seismic surveys, 44 percent of total, covered large areas about the Caspian Sea. Much success was gained in the salt-dome region of the Emba basin on the northeastern Caspian shore; reflection proved adequate along the coast near Baku; special methods of detonation on the surface had to be used in the Turkmenia desert.

2. Electrical surveys, 28 percent, covered considerable areas between the middle Volga and the Urals. They often combined D.C. current and gravity methods; distances up to 20 kilometers interspaced the electrodes. The geological interpretation of electrical results improved considerably.

3. The gravity measurements, 24 percent, had to be made mostly with torsion balances because of a scarcity of gravimeters. In Bashkiria, new oil-bearing structures were discovered.

4. Magnetic surveys served for the general delineation of structures in some regions. In all, geophysical exploration is considered to have made a valuable contribution to national defense. - V. S.

8416. Kintz, G. M. The Need of Standardized Instructions for Handling Explosives by Geophysical Parties. Min. Mag., Denver, Colo., vol. 35, No. 12, 1945, pp. 677-686.

Field crews suffer casualties during geophysical exploration because of insufficient knowledge on the use of explosives. The geophysical companies that made surveys in the Southern Central States paid over $47,000 in compensation during 1943-45. To remedy the situation, the author advises the adoption of standard instructions for handling and using explosives in field work. As a first step toward developing these, he advocates studying the facts and presents 15 analyses of accident reports filed with the U. S. Bureau of Mines. - V. S.

8417. Lahee, F. H. Review of Exploratory Drilling Statistics, 1938-44. Bull., Am. Assoc. Petrol. Geol., Tulsa, Okla., vol. 29, No. 11, 1945, pp. 1581-1592.

This review of exploratory drilling in the United States includes statistics on the prospecting methods used for locating boreholes. The material covers the period 1938-1944 and the area of 17 States. The gener trend of the relative success of various methods can be characterized by the following figures: (1) Data for 1938: Geology, 192 holes productive, 1,039 dry; geophysics, 78p, 251d; geology and geophysics, 31p, 67d; sundry nontechnical, 44p, 535d; unknown, 24p, 372d; totals: 369p, 2,264d; grand total, 2,633 holes. (2) Data for 1944 and the same differentiation: 568 2014d; 145p, 643d; 102p, 263d; 58p, 672d; 5p, 80d; totals: 878p, 3,672d; grand total: 4,550 holes. - V. S.

8418. Mining Journal, Phoenix, Ariz. Bureau Releases Program for Mining Reconversion. Vol. 29, No. 16, 1946, pp. 33-34.

The policy of the U. S. Bureau of Mines for the post-war reconversion period is to assist the country's mining industry by exploring natural resources. This work would include experimental research on exploratory methods and geophysical surveys of promising areas that do not lend themself to surface investigation. The deposits should be selected on the basis of their contribution to national security and opportunities for technical solutions advancing the utilization of mineral resources. - V.

8419. National Oil Scouts and Landmen's Association. Oil and Gas Field Development in United States, 1943. Austin, Tex., Yearbook 1944, vol. 14, 875 pp.

Assorted reports by district association editorial staffs and members outline oil and gas developments during 1943. They consist of reviews and statistics covering geological and geophysical prospecting, wildcat exploration, proven field extensions, leasing, production, and refining carried out in 27 States and the United States as a whole. The success of geophysical and other methods in locating productive holes is indicated in the material for some States and also in an appendix by F. H. Lahee on exploratory drilling in 27 States. - V. S.

8420. National Research Council, U. S. A. American Geophysical Union. R Nat. Acad. Sci., 1943-44, Government Printing Office, Washington, D. Senate Document 88, 1945, pp. 25-26.

The 25th annual meeting of the American Geophysical Union was held in Washington, D. C., on June 1-3, 1944. The resolutions adopted dealt with the postwar geophysical, oceanographic, and microseismic work, establishment of a geophysical station in Alaska, seismological cooperatio among the nations of the Western Hemisphere, and accurate time service. Consideration was also given to expanding scientific projects and expeditions made jointly by governmental agencies and private institutions. The papers and progress reports included 118 items. - V. S.

8421. National Research Council of Japan. Transactions and Abstracts, 1944. Japanese Jour. Geol. Geogr., Tokyo, vol. 19, Nos. 1-4, 1944, Section of Abstracts, pp. 31, 32, 34, 35, 38.

In the section of abstracts, brief bibliographical entries are made of the following Japanese geophysical publications:

Inoue, W. Radioactive prospecting at Hsing-ching Hot Spring (in Japanese). Bull., Geol. Inst. Hsinching, Manchukuo, No. 98, 1940, pp. 23-32.

Iwasita, M. Report on electrical prospecting at Hsing-ching Hot Spring, Chin-chour Province (in Japanese). Bull., Geol. Inst. Hsinching, Manchukuo, No. 98, 1940, pp. 33-42.

Matuzawa, T. Seismic investigations of the earthquake of March 2, 1933. Part 4: The spatial differentiation of waves propagated from the focus (in German). Bull., E. R. Inst. Tokyo Imp. Univ., vol. 19, 1941, pp. 104-114.

Nagata, T. A note on regional anomaly and secular variation in geomagnetism (in English). Bull., E. R. Inst. Tokyo Imp. Univ., vol. 20, 1942, pp. 107-119.

Takahasi, R., and Hirano, K. Changes in the vertical intensity of geomagnetism that accompanied the eruption of Miyakezima in 1940 (in English). Bull., E. R. Inst. Tokyo Imp. Univ., vol. 19, 1941, pp. 82-103.

Tsuboi, C. Relations between gravity anomalies and the corresponding subterranean mass distribution. Bull., E. R. Inst. Tokyo Imp. Univ., Part 1, with Yamaguti, S. (in English), vol. 19, 1941, pp. 26-38; Part 7 (in Japanese, English summary), vol. 20, 1942, pp. 30-38.

Some publications are also listed on the subject of volcanoes and associated phenomena. - V. S.

8422. Nature, London. Geological Service of the U. S. S. R. Vol. 154, No. 3913, 1944, p. 556.

In 1944, the Geological Committee of the Council of People's Commissars, U. S. S. R., concentrated on the search for new mineral deposits. Particular attention was devoted to molybdenum, tungsten, tin, mercury, and mica. A considerable number of geological field parties has worked in the field. They used modern techniques, such as the magnetic, gravitational, seismic, and other geophysical methods. Employment of the latter methods led to a number of discoveries in past years; for example, an aeromagnetic survey in western Siberia detected new iron deposits. With a view to aiding exploration, a special office, "Geological Records of the U. S. S. R." collect materials on all the geological work done on Soviet territory. In 1944, this office began compiling an encyclopedia of mineral deposits in the U. S. S. R. - V. S.

8423. U. S. Department of the Interior. Annual Report of the Secretary of the Interior for the Fiscal Year Ended June 30, 1945. Washington, D. C., Govern. Print. Office, 1945, 323 pp.

In his letter of transmittal, the Secretary attaches particular importance to the exploration of oil and metals in the continental shelf in view of the staggering depletion of national assets caused by the war.

The continental shelf comprises the ocean floor around the United States and its territories covered by no more than 600 feet of water. The whole area approximates 750,000 square miles. Along the Alaska coastline it extends several hundred miles under the Bering Sea; on the eastern coast it has a width of 20 to 250 miles, and along the Pacific coast it measures from 1 to 50 miles. The part reaching into the Gulf of Mexico alone could yield some 22 billion barrels of oil. The shelf is also estimated to contain rutile, sulfur, ilmenite, chromite, monazite, and other heavy minerals.

The oil reserves of the shelf may be brought under exploitation in a relatively short time because the techniques for recovering them from deep waters are considerably advanced. Oil companies have already recovered oil from an oil field 1 mile off the Louisiana shore and from another field 2 miles off the coast of Texas; one company explored the floor of the Gulf of Mexico up to 26 miles offshore.

The Department of the Interior has been assigned by the Government to explore the shelf. It plans a coordinated geophysical, geological, and engineering program. The work will be done partly aboard vessels and partl from submarines, diving bells, and airplanes. Instruments are being perfected. The cost of the survey may run to several million dollars. V. S

8424. Wenker, A. P. A Geophysical History of the Lovell Lake Oil Field, Jefferson County, Texas. Geophysics, Menasha, Wis., vol. 11, No. 3, 1946, pp. 302-311.

Before the advent of geophysics the proximity of Spindle Top to the Lovell Lake area, peculiar topography, and rumored gas seeps prompted the drilling of a number of wells. In 1929 a torsion-balance minimum roughly delineated the present area of the field. Later this minimum was checked by the gravity meter. In 1933 and again in 1935 reflection-seismograph surveys pointed to this locality. Shortly after the discovery well was brought in, a final reflection-seismograph survey defined the Lovell Lake structure rather accurately. - Author's abs.

9. RELATED NONGEOPHYSICAL SUBJECTS

8425. Barb, C. F. Selected Well Logs of Colorado. Quart. Colorado Sch. Min., Golden, Colo., vol. 41, No. 1, 1946, 435 pp.

A total of 2,733 wells have been drilled throughout Colorado's history and up to June 30, 1945, in the search for oil and gas. The author has collected the log records of those wells that might be considered wildcats, regardless of location or depth; some of the early wells had not been logged The tabulations presented give location, time, elevation, and depths of the formations; additional details amplify the data whenever possible. Many locations are plotted on a map complete to the end of 1944. The log records are accompanied by the geological correlation chart by C. E. Shoenfeld, a new field correlation chart and index map, both by J. R. Fanshawe, II, and several generalized cross sections. - V. S.

8426. Brod, I. O. Geological Terminology in Classification of Oil and Gas Accumulations. Bull. Am. Assoc. Petrol. Geol., Tulsa, Okla., vol. 29, No. 12, 1945, pp. 1738-1755.

A classification of oil and gas accumulations furthers both the theory and the applications of prospecting methods by organizing the concepts involved. Yet there is no standard classification, and not even any consistent use of terminology in practice and publications. To remedy this situation, the author presents his definitions and terms for discussion. The material covers oil-bearing rocks, source rocks, and accumulations of oil and gas. It is illustrated with drawings and accompanied by a bibliography. - V. S.

8427. Cooke, N. M., and Markus, John. Electronics Dictionary. McGraw-Hill Book Co., New York, 1st ed., 1945, 433 pp. Price, $5.

This is an illustrated glossary of over 6,000 electronic terms in English. Electronics is defined as concerned with the conduction of electricity through gases or in a vacuum. The practical applications covered include radio, television, radar, facsimile, sound recording, etc. The definitions are as comprehensive and lodged in a language as nearly popular as the subject matter allows. Because of the highly technical nature of most applications and their rapid expansion, the glossary contains many terms not given in the newest dictionaries. - V. S.

8428. Eastman Kodak Co. Kodak Materials for Aerial Photography. Rochester, N. Y., 24 pp.

This booklet presents data on Kodak aero films Super-XX, Tri-X, and Infrared, with a brief summary of the properties of these films and a detailed specification sheet for each film. Kodacolor films are described. Some phases of the processing of films, the sensitized materials serving for laboratory work in aerial mapping, and the conditions of film storage, particularly important with high-speed aero films, are discussed. - V. S.

8429. Fairbridge, R. W. Submarine Slumping and Location of Oil Bodies. Bull., Amer. Assoc. Petrol. Geol., vol. 30, No. 1, 1946, pp. 84-92.

The lessons of submarine slumping do not appear to have been utilized much in the past, to the advantage to which they might, in assisting both field and laboratory geologists in the survey, measurement, and appraisal of possible oil structures. A study of the paleogeographical implications of slumping leads to the conclusion that it may actually be an associated factor in the formation of oil. Typical examples of oil mother rocks are found in the Tertiary of the Carpathians and Caucasus, and a probable example of oil in the process of formation is to be seen in the Black Sea today; both are scenes of an enormous amount of submarine slumping both in the past and in the present. - Author's abs.

8430. Griffiths, J. C. Clay Research and Oil Development Problems. Jour. Inst. Petrol., London, vol. 32, No. 265, 1946, pp. 18.

There are two fundamental methods of approach to the problem of maintaining or augmenting oil reserves: The first demands geological exploration to discover new oil fields, whereas the second is based upon increasi the recovery efficiency in fields already under production. In either cas the increasing difficulties of locating new oil fields or of producing more oil from those already found demand a more detailed knowledge of the reservoir rocks and their development. Within this field of research the petrography of sedimentary rocks reigns supreme, and only by diligent pursuit of this subject can any spectacular advances be envisaged. It is the purpose of this paper to outline the significance of the clay material in the problem of oil exploitation and production. - Author's abs.

8431. Guyod, Hubert. Caliper Well Logging: Part 4, Caving Pattern in Abnormal Shales. Oil Weekly, Houston, Tex., vol. 119, No. 3, 1945, pp. 52-57.

In many cases caliper logs are of value for helping locate petroleum reservoirs. A few practical remarks regarding this unusual application of caliper data are offered in this article. It is recognized that the method is quite imperfect at present. Undoubtedly, there will be progress in the not too distant future. - Author's abs.

8432. Jolliffe, A. W. Aeroprospecting in the Yellowknife Area. Canadian Min. Met. Bull., Montreal, No. 401, 1945, pp. 588-609.

Aeroprospecting is viewed by the author as an aid to ground exploration. To illustrate such application, he describes the geological mapping of the Yellowknife area, Northwestern Territories. At first, unaided visual observation from the air provided general orientation for the original mapping. These data were further amplified in 1941-43 by air photographs, oblique and vertical. The techniques are discussed with regard to diagnositc advantages and interpretation. - V. S.

8433. Melton, F. A. Preliminary Observations on Geological Use of Aerial Photographs. Bull., Am. Assoc. Petrol. Geol., Tulsa, Okla., vol. 29, No. 12, 1945, pp. 1756-1765.

The author discusses the applications of aerial photographs to different types of geological relief. In regions of low relief, a good photo-index sheet is to be preferred to photo-mosaics, cost of which is out of proportion to their usefulness. In regions of high relief, however, the mosaic is now the only means for obtaining a continuous picture map and has much value. A geological diagnosis of terrain in either type of relief requires a study of relationships best realized with contact prints. In all, the expenses of exploratory surveys on photography prove negligible in comparison with returns. - V. S.

8434. Moon, L. B. Trends in Exploration of Mineral Deposits. Bureau of Mines Inf. Circ. 7312, Washington, D. C., 1945, 6 pp.

During the last 5 years, the U. S. Bureau of Mines has employed most of the engineering methods available for exploring mineral deposits after prospecting had detected them. The methods reported include the use of bucket drill, truck-mounted seismograph drill, oil-well rotary rig, and pneumatic wagon drill. The author adds: "Geophysics probably will be used as another tool in the exploration OF deposits in addition to its present role in the exploration FOR deposits. Drill holes and other openings for extracting samples will still continue to be needed, but the targets may be more precisely determined in advance." - V. S.

8435. Nelson, A. Disrupted Strata. Min. Quarry Eng., Maidenhead, Berks., England, vol. 10, No. 4, 1945, pp. 95-97.

The exploration of disrupted mineral veins and ore bodies offers considerable difficulty because of the complicated and unpredictable character of fractures. In surveys, costly errors are being made that could have been avoided with a better understanding of disrupted strata. The author seeks to assist the men planning exploration by listing the common misconceptions and explaining the nature of faulting processes. Consideration is given to normal fractures and fault striae, overthrow fractures, perplexing disruptions, and the determination of throw. The text is illustrated by drawings. (A review appeared in Min. Ind. Mag., South Africa, vol. 33, No. 10, 1945, pp. 615-619). - V. S.

8436. Nikolaev, N. Devonian Oil found in the Urals. Petroleum Times, London, vol. 49, No. 1,258, 1945, p. 833.

Until recently, a few oil fields in the world produced from Devonian strata. In the Soviet Union the first Devonian oil was found in 1944 in the Zhiguli hills on the Volga. This discovery stimulated drilling in Krasnokamsk, one of the richest sectors of the "Second Baku" region, situated between Volga and the Urals. As a result, a gusher was struck recently at a depth of nearly 2,000 meters. Geologists place a high value on the Devonian oil-bearing strata in this region. - V. S.

8437. Porter, W. W., II, and Gregersen, A. A. Significant California Petroleum Developments in 1944. Petrol. World, Los Angeles, Calif., Annual Review, 1945, pp. 81-88.

A statistical study is made of petroleum discoveries in California during 1944. The number of oil fields detected reached a high mark, but their average size declined to a record low. The latter is the more significant, as an all-time peak of 353 wells were drilled. The yield per field amounted only to some 7 million barrels; low yield figures have been repeated during the past 5 years. As regards geophysical methods, the marked decrease in the success of wildcats drilled on seismograph plays may mean that this method has passed here its optimal use. A differentiation of drilling successes by the prospecting methods employed shows that exploratory wells other than wildcats are becoming the most economical means of discovering new reserves in California. - V. S.

8438. Richards, H. G. The Subsurface Stratigraphy of the Atlantic Coastal Plain. Trans. New York Acad. Sci., Lancaster, Pa., ser. 2, vol. 8, No. 1, 1945, pp. 1-4.

A number of new wells were drilled along the Atlantic coastal plain during the war. The author has studied samples from many of them and correlated the subsurface formations to determine local stratigraphy. The region investigated extended from New Jersey through Georgia; samples from about 200 wells were analyzed. The principal wells are listed and the findings summarized. They may interest geophysicists, particularly in view of the stratigraphic continuity between coastal plains and the continental shelf. None of the oil wells drilled up to the present along the coast north of Florida proved productive. The conclusion is reached that the evidence available is not encouraging. Nevertheless, the east coast can not yet be considered as entirely devoid of oil deposits. - V. S.

8439. Umbgrove, J. H. F. Origin of Continental Shelves. Bull., Amer. Assoc. Petrol. Geol., Tulsa, Okla., vol. 30, No. 2, 1946, pp. 249-253.

In order to explain the common occurrence of a shelf edge at the isobath of 200 meters, a widespread subsidence of the shelf area in the order of 100 meters has to be assumed, apart from the influence of eustatic changes of sea level. Spasmodically, a warping or tilting movement has taken place along the continental border, causing submergence of what formerly was the margin of the continent and simultaneous bowing up of a marginal tract parallel with the newly formed coast line.

The most recent movements are revealed by the attitude of the marine terraces occurring along oceanic coasts in far-distant regions. It is argued that the periodical action of convection currents displaying themselves below the continental margin as a result of the existing distribution of sialic and simatic rocks in the border zone of continental and oceanic areas accounts for the periodical movements along the marginal flexure of the continents. So, the phenomena of the continental margin are correlated with other periodic events occurring in the earth's crust and its substratum.

Finally, a section is devoted to the submarine canyonlike trenches that are incised in the shelf body. These features are classified in thre groups. Theories involving a subaerial origin of the notched shelf edge are incompatible with data presently known about the geological history of the continental margin. - Author's abs.

10. PATENTS

(The figure in parentheses refers to the class in which the entry stands; see list in the table of contents).

8440. (1) Force-Measuring Instrument. L. J. B. LaCoste and A. Romberg, Austin, Tex. U. S. 2,377,889, issued June 12, 1945.

In a gravity-measuring instrument the combination comprising a mass, a plurality of elastic members supporting said mass, a support, one of said members being a zero-length spring, the point of attachment of said spring to the support being substantially in a vertical plane passing through the points of attachment of the other elastic members, means for moving the upper point of attachment of the zero-length spring, a determinable amount to bring the mass to a predetermined position, said last-mentioned means comprising an anchor block, to which the upper end of said spring is attached, said anchor block being attached to the support by leaf springs, a lever, and spaced leaf springs attached thereto and to said support and block respectively, whereby the effective point of support is movable a predetermined amount by said lever as a measure of variations in the force of gravity acting upon the mass - Claims allowed, 10.

8441. (1) Gravity Meter. R. C. Sweet, Tulsa, Okla., assignor to Stanolind Oil & Gas Co., Tulsa, Okla., a corporation of Delaware. U. S. 2,383,997 issued September 4, 1945.

A gravity meter comprising a support, gravity-responsive means, an elastic support member for supporting said gravity-responsive means, a resilient means connecting said gravity-responsive means to said elastic support member, a micro-adjustment means mounted on said support, a second resilient means interconnecting said elastic support means and said micro-adjustment means, whereby determinable micro-adjustments in the position of said gravity-responsive means are obtained, and means for determining the position of said gravity-responsive means. - Claims allowed, 9.

8442. (1) Apparatus for Making Gravity Measurements. M. E. Moore, Prospect Park, Pa., assignor to Sun Oil Co., Philadelphia, Pa., a corporation of New Jersey. U. S. 2,389,866, issued November 27, 1945.

An instrument for measuring small variations in gravitational attraction, comprising a member subjected to a torque, owing to a force exerted by gravity, and means for supporting said member for oscillatory movement about an axis spaced from the center of gravity of said member, including devices for preventing horizontal movements of said member and for maintaining said member in equilibrium in opposition to said torque, said devices comprising means for exerting at one point on said member a force along a line substantially spaced from the center of oscillation of said member and having a horizontal component and a vertical downward component, and means exerting at another point on said member a second force along another line substantially spaced from the center of oscillation of said member and having a horizontal component balancing the horizontal component of the first force and having a vertical upward component balancing the vertical downward component of the first force and the force of gravity, said forces exerting compression upon the portion of the member between said points and said lines of application of the forces varying in direction relative to said member during its oscillations. Claims allowed, 11.

8443. (2) Means and Method of Surveying Wells. G. E. Nevill, San
Antonio, Tex., assignor to J. V. Robinson, Montebello, Calif.
U. S. 2,369,403, issued February 13, 1945.

The combination with a drill stem and a core-forming drill of magnetic material attached to the lower end thereof and having a central axial opening, of a core-barrel seat formed in the opening, a guide spaced above said seat and axially alined therewith, a dummy core barrel lowerabl and removable through said drill stem, a shoulder on said dummy core barrel formed to engage such seat, said dummy core barrel being adapted to be supported in alined position by said seat and guide, a section on said dummy core barrel extending downwardly therefrom and adapted to pass through the axial opening in said drill as said dummy core barrel is lowered into seated position, and a chamber in said section adapted to hold a magnetic-type directional well-surveying instrument therein, said extension section being of nonmagnetic material and adapted to space the compass of the instrument a sufficient distance away from the drill to substantially avoid magnetic interference. Claims allowed, 7.

8444. (2) Method of Determining the Effective Range of Magnetic Detecto
P. P. Horni, Newark, N. J. U. S. 2,378,014, issued June 12, 194

A method of determining the desired effective range of a magneti detector by disposing a source of magnetic energy at a given distance from the coil of a magnetic detector, inserting overlapping laminations within the coil of the detector to form a core for said detector, and moving the overlapping core laminations inwardly or outwardly until the desired voltage is generated in the magnetic detector dependent upon the over-all length of the core, and securely binding the laminations together within the core, whereby the desired effective range of the detecto is known. - Claims allowed, 4.

8445. (2) Magnetic Field Responsive Device. J. C. Purves, Springfield, Mass., and L. F. Beach, Merrick, N. Y., assignors to Purves Corp., a corporation of Massachusetts. U. S. 2,383,460, issued August 28, 1945.

A magnetic-field responsive device comprising a magnetic circuit having a pair of substantially parallel elongated arms of magnetically permeable material, means for producing respective periodically varying fluxes instantaneously flowing in opposite directions in respective ones of said arms, said fluxes being of sufficient magnitude to operate said arms in varying permeability portions of their magnetic characteristics, and a pick-up coil having convolutions each wound about both of said arms, whereby, in the absence of an external magnetic field, the effects of said fluxes upon said coil balance out, but in the presence of said external field a resultant alternating voltage is produced in said pick-up coil having phase sense and magnitude corresponding to the direction of said field relative to said arms. - Claims allowed, 19.

8446. (2) Quadrantal Corrector for Magnetic Compasses. A. G. McNish, Washington, D. C., assignor to the United States of America, as represented by the Secretary of War. U. S. 2,390,844, issued December 11, 1945.

In combination with a magnetic compass having a needle, means for compensating for quadrantal deviation comprising a mounting stem in the axial line of the compass, a hub mounted for adjustment on and along said mounting stem, legs extending horizontally and radially from said hub, and collars of magentic material removably mounted on said legs, the number of said collars on said legs being variable for permitting correction of both the D and E terms in the compass deviation. - Claims allowed, 3.

8447. (3) Loading Basket for Explosive Charges. E. F. Darnell, San Antonio, Tex., assignor to Olive S. Petty, San Antonio, Tex. U. S. 2,377,763, issued June 5, 1945.

A loading basket for elongated explosive charges equipped at the top with a cap shield and lead anchor having a slot therein comprising in combination a ferrule for threaded attachment to a loading rod, splayed rods extending from the ferrule and shaped and spaced to loosely conform to the outside of the upper end of the charge, segmental rings connecting the rods together, the upper one being sized to engage the top of said shield to exert downward pressure thereon, and a lug on said top ring to engage in said shield slot to prevent relative rotation of the charge and basket. - Claims allowed, 9.

8448. (3) Blasting Cap. P. E. Narvarte, San Antonio, Tex., assignor to Olive S. Petty, San Antonio, Tex. U. S. 2,377,804, issued June 5, 1945.

Original from THE OHIO STATE UNIVERSITY

An electric blasting cap, said cap including a conducting shell containing a primer charge, a bridge wire embedded in said primer charge, and conducting leads connected by said bridge wire, insulating sealing means for said shell in which said leads are laid, and means, forming with the shell wall, a sealed chamber containing an ionizable gas affording a high-resistance path between each of said leads and said shell from points on said leads spaced substantially from said primer charge, the resistance of said paths being such as to permit discharge therethrough of electrostatic charges on said leads or shell which establish a high potential difference therebetween, but being appreciably lower than that afforded between said leads and said shell at points adjacent said primer charge, whereby detonation of the cap by electrostatic discharge is precluded. - Claims allowed, 1.

8449. Explosive Cartridge. J. B. Johnson, Wilmington, Del., assignor to Hercules Powder Co., Wilmington, Del., a corporation of Delaware. U. S. 2,378,223, issued June 12, 1945.

A tubular cartridge for blasting explosives, comprising a substantially cylindrical container formed from a rhomboidal sheet wrapped upon itself at least two and a fraction turns, whereby a portion of the container has more than two layers, a line of perforations disposed helically along an interposed layer of that portion of the said container having more than two layers, said line of perforations adapted to tear and thereby enable the cartridge to radially expand when longitudinally compressed. - Claims allowed, 8.

8450. (3) Seismic Prospecting System. E. E. Hoskins, and R. M. Moore, Pasadena, Calif., assignors, by mesne assignments, to United Geophysical Co., Passadena, Calif., a corporation of California. U. S. 2,378,925, issued June 26, 1945.

An apparatus for use in seismic surveying, the combination with a seismometer for converting incoming seismic energy into electrical wave form signals, and means for amplifying and recording such signals, said amplifying and recording means including automatic volume-control devices responsive to variation in received seismic energy, and devices responsive only to received seismic energy of amplitude, which is excessively large as compared to the amplitude of reflected waves, for rapidly reducing the sensitivity of said amplifying and recording means. - Claims allowed, 14.

8451. (3) Vibration Pickup. Howard Carson, Dayton, Ohio, assignor to Research Corporation, New York, N. Y., a corporation of New York. U. S. 2,387,223, issued October 16, 1945.

Original from THE OHIO STATE UNIVERSITY

Vibration-measuring apparatus comprising a casing, a seismic element movable in one direction in the casing, spring supports for the seismic element, each including a plurality of flat split rings, bracket means for connecting the rings of each support, means securing the supports to opposite ends of the seismic element and to the casing, and a rigid member connecting the brackets of both supports. - Claims allowed, 6.

8452. (3) Geological Prospecting System. R. A. Peterson, Pasadena, Calif., assignor to United Geophysical Co., Inc., a corporation of California. U. S. 2,388,703, issued Nov. 13, 1945.

In a method of delineating an ore body, the improvement which comprises generating at a source seismic waves which travel outwardly from the source and are diffracted by an ore body into the shadow zone of the ore body, receiving said diffracted waves at spaced reception points, determining the direction from which the diffracted waves travel to said reception points, plotting on a map coordinated with the region under investigation ray-lines representing the paths of travel of said diffracted waves to said reception points, and determining points of convergence of said ray-lines to locate extremities of the ore body on said map. - Claims allowed, 9.

8453. (3) Amplifier Circuits. H. G. Brinton, Pittsfield, Mass., assignor to General Electric Co., a corporation of New York. U. S. 2,390,773, issued December 11, 1945.

In an amplifier system of the type having a source of variable voltage, a pair of output terminals, and means for impressing a voltage across said output terminals which varies when the voltage of said source varies but by a much greater percentage, the combination of an impedance connected in circuit with said source of variable voltage, said impedance having a non-linear volt-ampere characteristic expressed by the equation

$$I = \left(\frac{E}{C}\right)^{\frac{1}{1-a}}$$

where I is the amperes through it, E is the volts across it, C is its ohmic impedance when carrying one ampere, and "a" is less than 1, a linear impedance connected in series with said non-linear impedance, the value of said linear impedance being so much smaller than the value of said non-linear impedance that substantially all of the voltage of said source of variable voltage is across said non-linear impedance throughout the entire range of variation of said voltage, a second non-linear impedance similar to the first one, means for connecting said second non-linear impedance in a circuit whose voltage is proportional to the current in the said linear impedance, a second linear impedance connected in series with said second non-linear impedance, the value of said second linear impedance being so much smaller than the value of said second non-linear impedance that substantially all of the voltage of the first linear impedance is across said second non-linear impedance throughout the entire range of variation of said voltage, means for obtaining a voltage which is responsive to the current in said second linear impedance, and means for impressing said last-mentioned voltage across said output terminals. - Claims allowed, 11

8454. (3) Recording System in Seismic Surveying. J. D. Eisler and J. A. Sharpe, Los Angeles, Calif., assignors, by mesne assignments, to Stanolind Oil & Gas Co., Tulsa, Okla., a corporation of Delaware. U. S. 2,394,990, issued Feb. 19, 1946.

In apparatus for use in reflection seismic surveying, a set of receptors for temporary records, means for impressing simultaneously on each of said receptors a record corresponding to waves produced by a seismometer or seismometers, the seismometer or seismometers being different for each receptor, a plurality of pickups associated with said receptors and arranged in a plurality of groups, each group comprising pickups associated with a plurality of said receptors, means for imparting related motions to all of said receptors whereby a point on any one of said receptors moves from the position of the impressing means associated with said receptor successively past the positions of the pickups associat with said receptor, electrical means connecting the pickups of each of said groups in a common electrical circuit, and recording means electrical connected with said electrical connecting means for producing simultaneous a plurality of composite records, each of said composite records correspon ing to the composited signals picked up by one of said groups of pickups. Claims allowed, 13.

8455. (3) Method and Apparatus for Seismic Prospecting. Jacob Neufeld, Tulsa, Okla., assignor to Engineering Laboratories, Inc., Tulsa, Okla., a corporation of Oklahoma. U. S. 2,395,289, issued Feb. 19, 1946.

In a method of seismic surveying in which seismic waves originat by a disturbance below the earth's surface are translated into electrical vibrations, the step of producing an electrical effect dependent upon a time derivative of said vibrations, and producing another electrical effec which represents substantially the ratio between said time derivative and said electrical vibrations. - Claims allowed, 6.

8456. (3) Seismic Surveying. O. S. Petty, San Antonio, Tex. U. S. 2,395,427, issued February 26, 1946.

In apparatus for recording seismic waves, the combination with means for receiving and transforming seismic waves into electrical wave-form signals, of an amplifying and recording system for said signals, said system including means operable automatically to vary, in respect to time, the relative response of said system to signals of different frequency. - Claims allowed, 19.

8457. (3) Seismic Exploration System. Herbert Hoover, Jr., Sierra Madre, Calif., assignor, by mesne assignments, to United Geophysical Co., Pasadena, Calif., a corporation of California. U. S. 2,395,481, issued Feb. 26, 1946.

In seismic prospecting, the improvement which comprises the steps of receiving a train of seismic waves, converting the received seismic waves into corresponding electrical waves, amplifying the electrical waves, utilizing a predetermined amplification factor for the first portion of the electrical wave train, shortly thereafter reducing the amplification factor of the electrical waves to a value which is low relative to said predetermined amplification factor, and then increasing the amplification factor of the electrical waves as a function of the time elapsed from a predetermined instant, ultimately increasing the amplification factor toward the end of the wave train reception to a higher value than the amplification factor utilized in connection with the initial portion of the wave train, and recording the amplified electrical waves. - Claims allowed, 2.

8458. (4) Process and Means for Measuring Soil Resistivity and Certain Electrical Characteristics Associated With a Buried Pipe Line. G. N. Scott, Beverly Hills, Calif., issued June 19, 1945.

A device for obtaining a substantially continuous record of an electrical characteristic of an energized soil over which the device is adapted to be moved comprising a vehicle, a plurality of electrodes in fixed separation mounted on and insulated from said vehicle, said electrodes being adapted for continuous movement over the surface of the soil and to make continuous electrical contact with the soil, and a recording meter connected to certain of said electrodes, said recording meter being mounted on said vehicle and the chart of said recording meter being adapted to be moved in direct proportion to the forward movement of said vehicle. - Claims allowed, 15.

8459. (4) Detecting Salt Water Intrusion, C. S. Sanders, Tulsa, Okla., assignor to Stanolind Oil and Gas Company, Tulsa, Okla., a corporation of Delaware. U. S. 2,379,106, issued June 26, 1945.

In apparatus for determining the location of at least one zone of water ingress into a well, including means for displacing the fluids in said well by a conditioning fluid, an electric characteristic of which differs from the same characteristic of said water, an electric cable adapted to be lowered into said well, means for determining the depth of the lower end of said cable in said well, and means for permitting ingress of water into said well after the lower end of said cable has been disposed in the region to be investigated in said well, the improvement comprising a series-connected group of alternate impedances and connectors of considerable length, the ends of which group are connected to two conductors of said cable, each impedance in said group being of different value from that of any other impedance in said group and from any combination of said impedances, a plurality of pairs of electrodes equal in number to the numbe of said impedances, the electrodes of each pair being connected to the opposite ends of only one of said impedances, a source of potential, means for applying said source across the upper terminals of said cable, and mean inserted in said circuit indluding said source, said cable, and said impedances for producing a visible indication of the flow of electric current in said circuit. - Claims allowed, 7.

8460. (4) Method for Making Geophysical Surveys. S. R. Phelan, Memphis, Tenn. U. S. 2,382,093, issued August 14, 1945.

A method of geophysically exploring subsurface earth structures which includes establishing a source of current and a pair of spaced groups of current introduction centers, each group comprising a plurality of individual centers widely spaced apart, connecting one pole of said source to all the said centers of one said group, and the opposite pole to all the said centers of the other said group to establish current flow; establishing a pick-up station in the area of jointly induced potentials about one said group, and making pick-up readings and recordings from currents induced by flow, and subsequently successively singly disconnecting the centers of one said group from and restoring them to connection with said source to vary the pattern of the potentials induced by said group, and making at said station additional readings and recordings during each said disconnection. - Claims allowed, 1.

8461. (4) Well Logging. C. R. Hocott, Houston, Tex., assignor to Standard Oil Development Co., a corporation of Delaware. U. S. 2,387,513, issued October 23, 1945.

A method for logging wells drilled for oil, which comprises collecting samples of the formation traversed at successive depths during the drilling operation, incorporating a measured amount of each sample into a half cell the potential of which is sensitive to the addition of a minute amount of a reducing component thereto, there being a separate identical half cell for each sample, and comparing the potentials of the half cells so modified with their potentials before modification, whereby the comparisons so made can be correlated with sample depths. - Claims allowed, 9.

8462. (4) Electrical Logging Apparatus. G. G. Harrington, Houston, Tex., assignor to Reed Roller Bit Co., Houston, Tex., a corporation of Texas. U. S. 2,388,141, issued October 30, 1945.

In a well-drilling apparatus, a drill stem, a drill bit, a drill collar having a drill-stem connecting portion and a drill-bit connecting portion electrically insulated from each other, and having a chamber therein communicating with the interior of the drill stem, a housing supported in said chamber and having a diaphragm positioned for exposure to fluid in said chamber, means in said housing for vibrating said diaphragm, said means including a variable-speed electric motor having stator and rotor windings, a source of electric power, and a circuit including said source of power and windings and connecting said source of power directly with one of said windings, and including means for completing the circuit through the other winding through the formation surrounding said drill collar to control the magnitude of current flowing through the circuit and thereby the speed of the motor in accordance with the electrical characteristics of the formation. - Claims allowed, 4.

8463. (4) Electrical Method and Apparatus for Logging Boreholes. C. B. Aiken, North Plainfield, N. J., assignor to Schlumberger Well Surveying Corp., Houston, Tex., a corporation of Delaware. U. S. 2,388,896, issued Nov. 13, 1945.

Apparatus for determining the boundaries of permeable formations traversed by a bore hole containing a column of conductive liquid through which spontaneous currents flow in the vicinity of relatively permeable formations comprising: three vertically spaced-apart electrodes adapted to be lowered into said bore hole, means directly electrically connecting said electrodes, means including at least one nonconducting body having a diameter substantially equal to the diameter of the bore hole forming a substantially complete barrier to the flow of electric current through the bore hole liquid between the uppermost electrode and the intermediate electrode, means including at least one nonconducting body having a diameter substantially equal to the diameter of the bore hole forming a substantially complete barrier to the flow of electrical current through the bore hole liquid between the lowermost electrode and said intermediate electrode, a fourth electrode in the bore hole spaced laterally from said intermediate electrode, and means for obtaining indications of the spontaneous potential differences between said intermediate electrode and said fourth electrode. - Claims allowed, 4.

8464. (4) Well Logging. Daniel Silverman, Tulsa, Okla., assignor to Stanolind Oil & Gas Co., Tulsa, Okla., a corporation of Delaware. U. S. 2,389,241, issued November 20, 1945.

Well-signalling apparatus, including an uninsulated conductor extending into said well, an electrode surrounding said conductor but insulated therefrom, the effective length of said electrode being substantially greater than its diameter, a step-down transformer the low-turns winding of which is connected between said conductor and said electrode, a source of pulsating electromotive force, a detector of pulsating electric signals, and means coupled to the earth near the head of said well capable of causing current to flow in the earth upon application of pulsating electromotive force to said means, one of said source and said detector being connected to the high turns winding of said transformer and the other of said source and said detector being connected at the surface of the earth to said means. - Claims allowed, 8.

8465. (4) Electrical Well Logging Method and Apparatus. M. E. Chun, LaJolla, Calif., assignor to Lane-Wells Co., Los Angeles, Calif. a corporation of Delaware. U. S. 2,393,009, issued January 15, 1946.

In an apparatus for electrically logging well bores, the combination with an input circuit including a source of electrical energy and a pair of input electrodes, at least one of which is movable along a well bore, said electrodes adapted to establish an electrical field in the formation traversed by the well bore, the combination of a probe circuit comprising: A plurality of probe electrodes adapted to be arrange in said well bore in predetermined fixed spaced relation to a movable input electrode; a measuring circuit including a conductor and a meter responsive to the potential applied to said conductor; a sequencing switch adjacent said probe electrodes for connecting said probe electrodes in succession to the conductor of said measuring circuit; and separate means connected between each probe electrode and said switch for substantially eliminating differences in the potentials applied to said measuring circui arising from differences in the strength of said electrical field at the different probe electrodes due solely to the differences in their respecti distances from said input electrode. - Claims allowed, 4.

8466. (4) Well Surveying Apparatus. J. T. Hayward and E. H. Cooley, Tulsa, Okla.; said Cooley assignor to Engineering Laboratories, Inc., Tulsa, Okla., a corporation of Oklahoma. U. S. 2,396,420, issued March 12, 1946.

An apparatus for continuously determining and recording a property of a substance passing through a process or operation, at a plurality of stages in the operation or process, that comprises means for determining the property at each of said stages in terms of electrical impedance, a bridge circuit for each determining means having said electrical impedance as one of its arms, means to supply electrical power to said bridge circuit, means to automatically vary the impedance of another arm of said bridge circuit to balance it and means to record the variation in the impedance of another arm of said bridge circuit to balance it and means to record the variation in the impedance for each determining device all upon a single record strip, means affected by any variation from a standard condition of the substance being tested, at each stage where it is being tested, said means being connected to affect the balance of the bridge for the recording means of that stage so as to compensate for any variation from the standard condition of the substance being tested, and means for shifting at least one recording device relative to the others so that all determinations on the same portion of the substance being tested will be placed alongside of each other or overlying each other on the record strip, despite the fact that the measurements are made at spaced time intervals as the portion of the substance passes through the operation or process. - Claims allowed, 4.

8467. (5) Method and Apparatus for Logging Boreholes. Gerhard Herzog, Houston, Tex., assignor to The Texas Co., New York, N. Y., a corporation of Delaware. U. S. 2,378,408, issued June 19, 1945.

A method of logging a bore hole, which comprises passing through said hole a pair of vertically elongated radiation detectors of different lengths, the shorter of said detectors being substantially as long as the vertical dimension of the thinnest stratum to be logged, moving said detectors through the hole at a slower rate when traversing the thinner strata than when traversing the thicker strata, and recording the output of said detectors as they are moved through the hole. - Claims allowed, 13.

8468. (5) Method and Apparatus for Logging Wells. D. G. C. Hare, Houston, Tex., assignor, by mesne assignments, to The Texas Co., New York, N. Y., a corporation of Delaware. U. S. 2,381,904, issued August 14, 1945.

In an apparatus for measuring variations in radioactivity of the formation traversed by a bore hole, a housing, a radiation detector in said housing, a wire cable for lowering said housing through the hole and supplying power to said detector and circuit elements in said housing, a vacuum-tube circuit in said housing for amplifying the output of said detector, a second vacuum-tube circuit for converting negative potentials from said first circuit to positive potentials, a third vacuum tube connected to said second circuit for equalizing the pulses from said second circuit and converting them to a series of interrupted unidirectional pulses, an oscillating tube circuit for generating a high-frequency carrier current, connections between said third tube and said oscillating-tube circuit whereby said carrier is modulated by the output of said third tube, means in said housing for coupling said modulated carrier to said cable, means for separating said carrier at the surface from power supply voltage and means for indicating level of said carrier. - Claims allowed, 3.

8469. (5) Well Surveying. R. G. Piety, Bartlesville, Okla., assignor to Phillips Petroleum Co., a corporation of Delaware. U. S. 2,385,378, issued September 25, 1945.

The method of surveying a well bore to determine at least one relationship of the relationships of approximate depth, approximate linear extent in depth, and approximate ability to receive additional fluid in situ, of earth formations in the uncased portion of the well, comprising in combination the steps of making a first radioactivity log of the natural radioactivity of the formations in situ in the well, injecting finely divided solid material having radioactivity into a section of the fluid in the well above the portion of the well in which the survey is to be made, forcing the well fluid down and out of the well into such of the earth formations as will receive the well fluid, making a log of the velocity of an interface of said section and the other well fluid, making a second log of the radioactivity of the formations in situ in the well, making at least one later log of the radioactivity to determine leaching, and determining from comparison of said logs at least one of said relationships - Claims allowed, 9.

8470. (5) Well Logging Method. R. E. Fearon, Tulsa, Okla., assignor to Well Surveys, Inc., Tulsa, Okla., a corporation of Delaware. U. S. 2,390,931, issued December 11, 1945.

Method of geophysical exploration which comprises dissolving in the well-drilling liquid a compound of sodium possessing artificial radioactivity produced by activation with alpha rays, whereby quantities of the dissolved material are retained by subsurface strata traversed by the well, removing the said liquid not thus retained, and subsequently logging the well to obtain measurements of subterranean radioactivity correlated with measurements of depth. - Claims allowed, 6.

8471. (5) Radioactivity Well-Logging. L. G. Howell, Houston, Tex., assignor to Standard Oil Development Co., a corporation of Delaware. U. S. 2,391,093, issued December 18, 1945.

A method of measuring radiation that comprises subjecting a compressed gaseous medium, in the presence of radiation, to a constant electrical potential sufficient to cause a continuous current flow proportional to the intensity of said radiation, continuously measuring said current flow without appreciably altering the potential on the gaseous medium, and continuously recording the measurement. - Claims allowed, 9.

8472. (7) Analyzing Earth Formations. H. F. Sturgis, Tulsa, Okla., assignor to Stanolind Oil & Gas Co., Tulsa, Okla., a corporation of Delaware. U. S. 2,379,045, issued June 26, 1945.

The method for the determination of hydrocarbons in earth formations whichcomprises heating a sample of said earth formation sufficiently to vaporize at least a substantial part of said hydrocarbons, passing said vaporized hydrocarbons into a cooled water immiscible absorption medium whereby said hydrocarbons are absorbed, thereafter passing steam through said heated sample and into said absorption medium whereby hydrocarbons remaining in said sample are vaporized and absorbed in said absorption medium, condensing the steam in said absorption medium, and determining the amount of the hydrocarbons absorbed in said absorption medium. - Claims allowed, 9.

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8473. (7) Method of Obtaining Soil Gas Samples. W. M. Zaikowsky, Pasadena, and H. E. Metcalf, San Francisco, Calif., assignors, by direct and mesne assignments, to Consolidated Engineering Corp., Pasadena, Calif., a corporation of California. U. S. 2,386,832, issued October 16, 1945.

The method of obtaining a soil gas sample from a core section located entirely beneath the surface of the earth, which comprises isolating such core section in situ against an interchange of gas with adjacent laterally disposed soil, stimulating the flow of contained gas from such section and collecting the same. - Claims allowed, 5.

8474. (7) Geochemical Prospecting. E. E. Roper, Tulsa, Okla., assignor to Stanolind Oil & Gas Co., Tulsa, Okla., a corporation of Delaware. U. S. 2,395,014, issued Feb. 19, 1946.

In a method of geochemical prospecting wherein soil gases are analyzed for significant hydrocarbon content as an indication of petroliferous deposits below the location from which the gases were obtained, said gases containing relatively unstable impurities which normally, over a period of time, decreasingly exaggerate the results of the subsequent analysis for significant hydrocarbon content, the steps of desorbing the gases from the soil, treating said gases, after removal from the soil but before analysis, with a strong oxidizing agent which is inert toward said significant hydrocarbons, said treatment being carried out under such conditions that said impurities are largely removed from the gases, the treated gases being protected pending analysis from contamination by other hydrocarbon-containing gases, whereby the subsequently obtained analytical result will be more reliable. - Claims allowed, 7.

8475. (8) Well Surveying Instrument. R. D. Agnew, Coalinga, Calif., assignor to Schlumberger Well Surveying Corp., Houston, Tex., a corporation of Delaware. U. S. 2,378,526, issued June 19, 1945.

In apparatus for determining the inclination of a bore hole, the combination of a casing adapted to be lowered into a bore hole with its axis maintained in fixed relation to the axis of the bore hole, photosensitive means mounted in the casing, a pendulum swingably mounted in the casing above said photosensitive means, means in said pendulum for directing a beam of radiant energy axially of said pendulum from its lower end to said photo-sensitive means, and a member mounted between said pendulum and said photosensitive means for modifying the intensity of the beam in accordance with the inclination of the bore hole, said member having one degree of transparency in the central portion thereof and different degrees of transparency at zones concentric with, and spaced at different radial distances from, said central portion. - Claims allowed, 2.

8476. (8) Geophysical Prospecting Apparatus. A. F. Hasbrook, San
Antonio, Tex., assignor to O. S. Petty, San Antonio, Tex.
U. S. 2,383,966, issued September 4, 1945.

Apparatus for geophysical prospecting on the floors of bodies of water comprising, in combination, a water-tight housing, means to support the same rigidly on such a floor, a cased geophysical instrument in said housing, gimbals supporting the instrument casing for self-levelin within the housing, a plurality of clamping devices each including means adapted to be extended between the housing and casing to lock them against relative movement, a motor adapted to move each of said means slowly, a control to start the motors from the water surface, and means to stop each motor automatically when its clamping means contacts one of the parts to be clamped together. - Claims allowed, 11.

8477. (8) Geophysical Prospecting Apparatus. A. F. Hasbrook, San Antoni
Tex., assignor to O. S. Petty, San Antonio, Tex. U. S. 2,384,73
issued September 11, 1945.

Apparatus for geophysical prospecting on the floors of bodies of water comprising, in combination, a water-tight housing, means to support the same rigidly on such floor, a geophysical instrument in said housing, gimbals supporting the instrument for substantial self-leveling within the housing, means carried by said instrument to detect out-of-level conditions thereof, a weight carried by said instrument and movable to positions to correct the balance and level of the casing, and devices responsive to the detecting means on occurrence of out-of-level conditions for displacing said weight to cause the instrument to swing in said gimbals to a level position. -Claims allowed, 5.

8478. (8) Acoustic Logging. J. E. Walstrom, Houston, Tex., assignor
to Schlumberger Well Surveying Corp., Houston, Tex., a corporation of Delaware. U. S. 2,396,935, issued March 19, 1946.

Apparatus for investigating earth formations traversed by a bore hole, comprising first wall-engaging means adapted to be moved through the bore hole in engagement with the wall thereof and being relatively smooth where it engages said wall, second wall-engaging means movable with said first wall-engaging means and having a cutting edge where it engages the wall of the bore hole, vibration responsive means associated with each of said wall engaging means, and means for indicating the responses of said respective vibration responsive means. - Claims allowed, 6.

8479. (9) Short Time Interval Meter. H. L. Clark, Ballston Lake, N. Y.,
assignor to General Electric Co., a corporation of New York.
U. S. 2,377,757, issued June 5, 1945.

In a time interval meter, a condenser, a source of direct-current supply, a circuit including switching means for connecting said condenser in charging relation with said source during a time interval to be measured, means for assuring a definite initial charge on said condenser at the time of making such time-measurement connection, and regulating means for maintaining the charging rate of said condenser constant during such time-measurement connection. - Claims allowed, 11.

8480. (9) Transient Signal Recording-Reproducing Device. J. P. Arndt, Jr., Euclid, Ohio, assignor to The Brush Development Co., Cleveland, Ohio, a corporation of Ohio. U. S. 2,378,383, issued June 19, 1945.

In a system for studying transient signal occurrences and associated with a source of at least a first transient signal and second transient signal: an endless cyclically moving recording medium of a limited reproducibly recordable frequency range; carrier frequency supply means for supplying a first carrier current of a first frequency and a second carrier current of a second frequency differing from said first frequency, each of said carrier currents being of a frequency reproducibly recordable on said moving recording medium; modulating means for modulating the first carrier current by the first signal and providing thereby a corresponding first modulated signal and for modulating the second carrier current by the second signal and providing thereby a corresponding second modulated signal; recording means for recording on said medium signals corresponding to said first signal and second signal; reproducing means including demodulating means for cyclically reproducing from said medium the recorded signals and for cyclically supplying from the reproduced signals a first reproduced signal corresponding to said first signal and a second reproduced signal corresponding to said second signal; and cyclically operative indicating means cyclically actuated by said different reproduced signals for simultaneously visually presenting images corresponding to the different signals reproduced from the cyclically moving medium. - Claims allowed, 15.

8481. (9) Recording and Reproducing Device. S. J. Begun, Cleveland Heights, Ohio, assignor to the Brush Develpment Co., Cleveland, Ohio, a corporation of Ohio. U. S. 2,378,388, issued June 19, 1945.

In a system for recording a transient circuit condition which may occur in an electric circuit at an unpredictable instant and for reproducing the record; an endlessly operating, cyclically effective recording medium; recording means connected to the circuit in which a transient is expected for continuously recording the circuit conditions; means for obliterating the recorded signal; means responsive to an occurrence of a transient circuit condition for rendering the obliterating means inoperative; means operative a time interval thereafter for rendering the

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recording means inoperative so as to retain on said recording medium a record corresponding to said transient condition; and reproducing means operative to cyclically reproduce the record recorded on said recording medium. - Claims allowed, 31.

8482. (9) Recording-Reproducing Device. S. J. Begun, Cleveland Heights, Ohio, assignor to The Brush Development Co., Cleveland, Ohio, a coporation of Ohio. U. S. 2,378,389, issued June 19, 1945.

In a system for reproducing characteristic images of transient electric occurrences of an electric circuit system which operates under predetermined normal conditions: a plurality of electric transmission channels connected to pass a first electric transient occurrence and a second electric transient occurrence; an endlessly acting magnetic recordin medium having a given recording length; driving means for driving said recording medium so that it operates during a continuous period in successive cycles throughout its length; recording means for magnetically recording on said medium said first and said second transient occurrences; obliterating means for obliterating the magnetic records of said recording medium; trigger means interconnected to control the operation of said recording means and said obliterating means; said trigger means being operative to cause said recording means to continuously record on said medium electric occurrences passed through said channels; said trigger means being operative in response to a transient occurrence passed through a channel to stop the obliterating operation and recording operation. - Claims allowed, 5.

8483. (9) Gun Perforator. Marcel Schlumberger, Paris, France. Vested in the Alien Property Custodian. U. S. 2,381,081, issued August 7, 1945.

A well-casing perforator which comprises at least one body member provided with at least two distinct powder-chambers extending substantially longitudinally therein and located in peripheral regions thereof, with thei transverse axes in close proximity to each other, and means forming at least one barrel hole extending from each of said chambers to the outer wall of said body member and passing through the central portion thereof. - Claims allowed, 25.

8484. (9) Device for Viewing Underwater Bodies. E. R. F. Johnson, United States Navy. U. S. 2,396,267, issued March 12, 1946.

In an apparatus for viewing an underwater body at a distance in turbid water and having an air chamber provided with a viewing location for receiving an objective lens for viewing the body, the combination of a hollow, closed member covering and alined with said location and displacing a sufficient portion of the turbid water from the cone of vision from said location to embrace an angle on the order of said cone of vision, the member extending a substantial distance from said location and

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approximately to said body to be viewed and having a transparent forward end wall aligned with said location and substantially coinciding with said cone of vision, and a clear liquid confined by said member and having generally the same index of refraction as the water, said liquid substantially filling the member whereby the apparatus is of substantially the same specific gravity as the water. - Claims allowed, 5.

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